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ABSTRACT

This guide is designed to assist the classroom teacher through all the major phases of development of an outcome-based curriculum. It is intended to aid in modifying a conventional curriculum to an outcome-based (competency-based) curriculum (OBC), building a course or program around an outcome-based model, revising curriculum toward an outcome-based model, and using curriculum resources. The main body of the guide contains sections with step-by-step approaches and brief explanations. These steps are described: task list verification, what to do with a verified task list, task standards and conditions, enabling objectives, performance guides, evaluation, using a competency profile, teaching activities, and lesson planning. A checklist for action is provided. Attached to the 38-page guide is a resource guide to which reference notations are made in the teacher's guide. The resource guide is divided into four sections. The performance objectives section contains materials on components of objectives, rules for performance objectives, domains of objectives, and shopping lists of verbs. The evaluation tools section offers definitions, describes the three domains, and contains indepth discussions of cognitive, psychomotor, and affective evaluation. The third section is a guide for implementing articulation. The final section offers suggestions for special needs students. (YLB)

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FROM TASK LIST TO CURRICULUM

A TEACHER'S GUIDE TO OUTCOME-BASED CURRICULUM

SECOND EDITION

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U.S. DEPARTMENT OF EDUCATION
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FROM TASK LIST

TO

CURRICULUM

A TEACHER'S GUIDE TO OUTCOME-BASED CURRICULUM

1991

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INTRODUCTION

This guide is designed to assist the classroom teacher in:

- Modifying conventional curriculum to outcome-based (competency-based) curriculum (OBC)
- Building a course or program around an outcome-based model.
- Revising curriculum toward an outcome-base model
- Utilizing curriculum resources

Outcome-based (competency-based) curriculum is a systematic approach to educating the student to specific occupational tasks. The direction and evaluation of instruction is focused on the occupational tasks. In newer outcome-based task analyses, supporting academic foundations are identified. In all sound outcome-based models, employability skills are considered.

Curriculum is a complete educational plan. It has basically two components:

- What to teach
- How to teach

The what to teach is essentially:

- A verified task list
- Task standards
- Task conditions
- Performance objectives
- Expected outcomes

The how to teach is the:

- Criterion-referenced evaluation
- Performance guide
- Teaching activities
- Lesson plan

This guide will assist the classroom teacher through all of the major phases of curriculum development - the what and the how.

OBC STEPS

TASK LIST
↓
VERIFICATION
↓
VERIFIED TASK LIST
↓
COMPARING TASKS
↓
TASK STANDARDS
↓
TASK CONDITIONS
↓
ENABLING OBJECTIVES
↓
ACADEMIC FOUNDATIONS
↓
CRITERION-REFERENCED EVALUATION
↓
PERFORMANCE GUIDE
↓
TEACHING ACTIVITIES
↓
LESSON PLANS/LEARNING ACTIVITY PACKETS/ETC.

OBC RATIONALE

OBC is a systematic approach to curriculum development which:

- Helps assure needed occupational tasks are taught
- Helps assure a complete curriculum
- Increases educational accountability
- Assists in articulation
- Promotes sound evaluation based on desired outcomes
- Focuses education
- Responds to diversity in students

HOW TO USE THIS GUIDE

The main body of this guide contains sections with step by step approaches and very brief explanations. When more detailed information is suggested, there will be a reference notation to the Resource Guide included. This particular design allows the reader to quickly pinpoint desired information or read a fuller developmental explanation in an area of need.

Where does a person start? The following matrix will provide help in determining what is needed. Look down the left margin and locate what you have; look across to the "x'd" areas for what you will need to adopt, adapt, or develop.

WHAT YOU HAVE AND WHAT YOU NEED

I HAVE	Need→	Task List	Verification	Course Outline	Standards & Conditions	Objectives	Evaluation	Performance Guide	Competency Profile	Teaching Activities	Lesson Plan	Resources
	Nothing	X	X	X	X	X	X	X	X	X	X	X
	VTECS Catalog		X	X			X		X	X	X	X
	VTECS Curric. Guide		X	X					X	X	X	X
	MAVCC Materials		X	*					O		X	
	Co. Task Analysis		X	X			X	X		X	X	X
	Task List		X	X	X	X	X	X	X	X	X	X
	Existing Curriculum✪	X	X		X	*	*	X	X			*

* - Possible/Probable Additional Work/Revision Required
✪ - Using Steps Suggested in "Verified Task List Section"
O - Some Available

IMPLEMENTING OUTCOME/COMPETENCY-BASED CURRICULUM

STEPS	WHO
1. Obtain a task list	Karen Anderson, Manager Curriculum Services Library Center (303) 988-6160 X 281
2. Verify the task list	Advisory committee plus ad hoc participants (incumbent workers only)
3. Compare verified list to current curriculum	Teacher/advisory subcommittee
4. Develop standard and conditions for each task	Advisory committee plus ad hoc participants
5. Write performance objectives for each task	Teacher
6. Develop criterion-referenced evaluation for each task	Teacher
7. Develop performance guide for each task	Teacher/advisory subcommittee
8. Write teaching/learning activities for each task	Teacher
9. Develop individualized self-packets or lessons.	

If consortium materials (V-TECH or MAVCC) or Colorado Task Analyses are being used, steps 1, 4, 5, 6, 7 & 8 may be simplified. These steps may be adopted or adapted from existing materials if they are consistent with the task to be taught.

LIST OF TERMS

COMPETENCY - Ability or desired outcome. A standard of performance which is required in order for a worker to perform a given occupational task.

COMPETENCY - An activity which a person performs in an occupation which is both measurable and observable and which is the basis for competency-based/outcome-based curriculum.

COMPETENCY-BASED CURRICULUM - A specialized system of education designed to teach clusters of skills and knowledge (competencies) a person performs in an occupation, mastery of which forms the basis of student evaluation.

CRITERION-REFERENCED EVALUATION - Measuring of a learner's performance against predetermined criteria built into the task analysis or objectives.

*OUTCOME-BASED CURRICULUM - A competency-based system focusing on learner outcomes.

PERFORMANCE GUIDE - List the series of steps which when followed sequentially results in the completion of a given task.

PERFORMANCE OBJECTIVE - An educational directive for instruction and evaluation.

TASK - A unit of work associated with a specific job which results in the completion of a process and/or product when competently performed.

TASK CONDITION - the "stuff" used in performing the task: tools, equipment, work aids, and special specific environmental considerations.

TASK STANDARD - The predetermined criteria of performance of a task. A measurable quality indicator.

VERIFICATION (TASK LIST) - The formal or informal process of reviewing, adopting, and/or modifying a task list to meet the needs of a specific community, region, or state.

*In the remainder of this text the term "outcome-based" will be used as opposed to the term "competency-based."

TASK LIST VERIFICATION

A task list is a set of occupational skills, written in performance terms, which is the result of occupational research. The list tells precisely what occupational (psychomotor) skills the worker needs, therefore what skills the completing student should have. Tasks are often arranged in related groups called duty areas.

Verification is an **ABSOLUTELY NECESSARY** step in curriculum development. Simply stated - verification is a process of assuring that the task list meets the needs of local business and industry.

> "No matter how well something is taught, if it's not worth teaching, it's not worth teaching well." (Elliot Eisner, Stanford University)

This section will provide you with guidelines for various types of verification. Keep in mind that the better the verification - the better the curriculum.

PROGRAM ADVISORY COUNCIL (PAC)

Vocational education has used advisory councils for generations to improve vocational programs at the local and state level. The experience and expertise of members make their advice and assistance valuable in such areas as equipment purchases, job exploration and opportunities and locations for hands-on experience.

The Program Advisory Council consists of people willing to donate time for the purpose of reviewing and discussing task lists. This is a different type of meeting than most advisory council members are used to.

The PAC technique assumes that a continuing advisory council is already in place to serve the purposes cited above. A special ad hoc committee may need to be established for the purpose of task list verification. Members decide which tasks should be added or deleted. This is accomplished at formal meetings, designed specifically for this purpose.

The process should be started with the most current task list available. Instructors may review this list and add any tasks they feel are missing. This may only be done before he verification process.

Guidelines/Steps

A PAC meeting for task verification will be more productive if conducted in accordance with the following guidelines:

1. Review the council membership. Do members represent the job area? If there is not a craft advisory committee for this occupation, it will be necessary to form an ad hoc committee. The ad hoc committee should include eight to ten experts from the occupation (incumbent workers). Some may be supervisors of workers in the occupation. The recommended ratio is four workers to one supervisor.

2. Review purpose of existing council. Intact procedures may not allow task verification to occur.
3. Modify guidelines and policy for task verification purposes. Revise the guidelines and policy to encourage/accommodate task list verification.
4. Estimate meeting agenda. Time should allow committee members to review the complete list of competencies.
5. Schedule meeting facility.
6. Confirm participation.
7. Conduct meeting

The meeting should be conducted as close to the Structured Group Interview techniques as possible. The principle guidelines are:

- School program representative does not participate but keeps group moving.
- Group consensus determines if each task is kept, deleted or changed.
- Committee members recognize that their decision on tasks will determine the program content base.

<u>When PAC Should Be Used</u>

The PAC can be used for verification when it is impossible to convene an SGI committee. It should be noted that a general PAC may contain few incumbent workers in the occupation to be verified. The PAC is most used when verifying an occupation that is very stable and needs little change.

Pros and Cons

The following list of pros and cons will help in determining if this technique is the one best suited to the local situation.

Pros:

Quick. Within a short period of time, the council can verify a task list.

Low cost. The council members are donating their time. Minimal expenses include providing multiple copies of task lists, paper and pencils.

Efficient. The members are from the local area which reduces travel and meal expenses. It is easy to contact members. Minimum time is needed for organizing the meeting. Few restrictions exist.

Minimal staff time. Staff time is desirable for assistance with committee member selection.

No staff training. The staff does not require training.

Cons:

Unorganized. If guidelines are not utilized, a PAC has a tendency to waste members time and the purpose is not defined.

Personalities dominate. The more outspoken, aggressive, and assertive members control the meeting and limit interaction with members.

Bias. Factors which influence selection of PAC members may result in a group not representative of the skills and abilities needed to perform the job.

Little staff development. Unless special efforts are made, staff development is limited.

WORKER SURVEY

The survey is a popular technique used to obtain a representative opinion of a targeted population. Either a telephone or mail survey may be used; however, the mail survey is preferred due to available resources of time, staff and money.

The survey is used to obtain opinions as to importance of each task of a specific job. The validated instrument (questionnaire) is mailed to each person in a sample of the targeted population. The person is asked to respond to the items and return the completed questionnaire.

Workers who are most familiar with a particular job complete the questionnaire. The success of this method depends on the workers' ability to (1) interpret correctly the questionnaire items (typically a series of short-answer questions) and (2) provide accurate and easy-to-classify answers. In comparison to other methods of collecting job information, a large amount of information can be obtained by a questionnaire.

The questionnaire method is appropriate for the following situations:

1. The job to be analyzed is not especially difficult to describe
2. The job is comprised of physical activities instead of human relations or personality factors. Generally, workers find it difficult to assess the importance of human relations or personality factors.
3. There are a large number of employees whose jobs are to be analyzed.
4. Large amounts of job information has to be obtained.
5. The questionnaire can be precisely and clearly worded.

The design of the questionnaire is determined to a great extent by the number of workers being surveyed. For a small number of employees, a questionnaire may be sufficient if it includes: title of the job; description of the duties and tasks performed daily, weekly, monthly, quarterly, and annually; special requirements (skills, knowledges, attitudes); and special work performed on the job. The questionnaire can allow for more descriptive responses from individuals. When a greater number of workers is expected to complete the questionnaire, more detail may be required. In order to restrict descriptive responses, every effort is made to keep questionnaire items close-ended.

Guidelines/Steps

A higher return rate and valid data are easier to obtain by following these guidelines:

1. Identify sample size and respondents. The target population (total number of workers employed at the specific job) is ascertained and from that sample size (percentage of target population) is determined. Establishments employing the workers must be identified prior to mailing the questionnaire.
2. Identify or develop questionnaire. If a questionnaire which will meet the specific needs cannot be identified, one must be designed or an existing one modified. (Curriculum Services, CCCOES, can assist).
3. Decide on ratings to use. Ratings include frequency of task performance, importance of task, complexity and criticality.
4. Prepare a cover letter. A letter explaining the purpose of the questionnaire and requesting the individual's assistance accompanies the questionnaire. This is the main way of promoting public relations. Always thank the worker for completing the questionnaire.

5. Establish a realistic time frame. Allow time to 1) develop, modify and validate the questionnaire; 2) print the needed number of questionnaires; 3) prepare the cover letter; 4) mail the questionnaire; 5) implement follow-up procedures; and 6) analyze, compile, and interpret data.
6. Decide protocol for sending questionnaire. Make preliminary arrangements with the establishment employing the workers. The supervisor of the workers should be informed about the questionnaire and should approve the worker's participation.
7. Aim for 70% response. Methods for obtaining at least a 70% response should be identified (i.e., enclosing a self-addressed, stamped return envelope) and resources should be available for follow-up.
8. Design and implement follow-up activities. Follow-up activities assure a higher return rate. Rewards such as a stick of gum or packet of coffee accompanying the follow-up helps generate responses.

Data

The survey will generate an abundance of data. Every effort is made to request data needed only to accomplish the purpose of the survey, i.e., task lists. If additional data is requested make sure there is a purpose in requesting the data and the results will be utilized. Analysis of the data yields a task list based on frequency of response and ratings.

Success factors for a survey are:

Good Organization
Quality Service Questionnaire
Representative Sampling
High Return Rate
Resources for Mailing Survey
Ability to Tabulate And Interpret Data

The following procedures checklist will help individuals responsible for the survey attain a high return of complete, valid data from respondents.

1. Identify the sample to be surveyed.
2. Outline the objectives of the survey and the tasks to be accomplished.
3. Develop a timetable for completing the survey.
4. Appoint a committee to assist with the survey.
5. Select the sample to be surveyed.
6. Develop the questionnaire.
7. Develop the cover letter or covering directions.
8. Meet with data processing people to discuss coding the questionnaire.
9. Try out (pretest) the questionnaire.
10. Revise the questionnaire, if needed.
11. Meet with data processing people to code the questionnaire.
12. Conduct the survey.
    (a) Develop a schedule for sending surveys and reminder cards.
    (b) Mail first cover letter and questionnaire.
    (c) Send thank you/reminder cards after one week.
    (d) Send second cover letter with questionnaire (after second week).
    (e) Place telephone calls to non-respondents, optional.
13. Tabulate the data.
14. Analyze the data.
15. Interpret the data.
16. Prepare a report of the findings.
17. Disseminate findings.

<u>Pros and Cons</u>

The following list of pros and cons of a mail survey will help determine if this is the best technique.

Pros:

Low Cost. The basic cost for conducting a worker survey includes copies of the cover letter and questionnaire, envelopes and postage.

Promotes public relations. A brief explanation of the purpose of the questionnaire is a way of bringing attention to program offerings.

Involves staff. The data obtained from the survey can be analyzed by the staff involved with the specific program. Such involvement usually stimulates interest and creates a feeling of ownership.

Allows multiple areas of ratings. More than one area of rating can be obtained from the questionnaire. Areas to be rated may include importance of task, frequency of performance, complexity of task, and criticality.

Cons:

Time consuming. Using a pre-designed questionnaire, providing necessary copies and doing a one-time mailing requires a minimum of two to three weeks. Additional time is needed if the questionnaire must be developed or modified and validated, if a follow-up is conducted and if the sample size is large. The length and complexity of the questionnaire affects time needed for analysis and compilation of data.

Requires follow-up. Though a deadline for return of questionnaires is identified, a reminder is used to obtain a higher return rate. Depending on the return rate, two follow-ups may be necessary. Resources must be available for the follow-up.

Requires survey research skills and data analysis. Special skills are needed for identification or development of the questionnaire and for analyzing, compiling and reporting the data. Because of conflicting data, a researcher is needed to interpret results accurately.

Subject to sampling bias. Guidelines exist and should be adhered to when selecting the sample. Otherwise data obtained will not represent the targeted population.

Subject to demand characteristics. The design of the questionnaire may reflect what is "popular" at that particular time. Thus, the questionnaire and response will have characteristics related to the demands associated with the job. Validation of the questionnaire minimizes this factor.

Subject to questionnaire bias. The structure of the questionnaire may reflect the "designer's" view which fosters an inaccurate reflection of job duties and tasks from the respondents.

Generates little commitment. Personal interaction between people (staff) involved with the program and survey and individuals responding to the questionnaire is minimal. It is difficult for respondents to realize the value their contributions will make to the program.

WHAT TO DO WITH A VERIFIED TASK LIST

A locally verified task list is a very valuable curriculum tool. It can be used in the following ways:

- Starting from "scratch" or revising curriculum based on the new task list.
- Modifying or updating current curriculum

Starting From Scratch/Major Revision

- Arrange the tasks into courses; break them down into units or vise versa.
- Unit tasks should be closely related.
- Tasks within a course can be more loosely related.
- The result should be a set of courses within a program with unit grouped tasks making up the content.
- If revising, compare new content to existing content, rescue and set aside old content areas which match the new tasklist.

Modifying/Updating

- Use the verified task list as a template for existing curriculum.
- Delete content which is not reflected in task list
- Add tasks which are on list but not currently in content.
- Modify content to match task list.

TASK STANDARDS - THE BASIS FOR EVALUATION

A task is a unit of work but it says nothing about how well the task should be performed.

A task standard is the performance quality indicator. It clearly states, in measurable terms:

- What the work/product should look like when done correctly, e.g., smooth, with no bubbles.
- The expected level of precision, e.g., ± 10mm, ± 5%.
- Any additional indicators are, e.g., time.

(NOTE: Terms like: appropriately, correctly, accurately, etc., should not be used in a standard.

When an outside standard is available, you may use it: e.g., according to General Motors ignition standard; according to APA citation guidelines, according to CDC guidelines on infection control, etc.)

PROCEDURE

- Review task.
- Is there an outside or business and industry standard for performing the task? If so, use it.
- Determine the quality indicators of accurate, correct, appropriate, and/or precise performance.
- Formulate a standard statement, e.g., "The weld must be smooth, free from bubbles. The plates must not vary more than 1/4°."
- This statement will be how you evaluate the student's performance of the task. Does it say all that you would expect in performance?

- Note the source of the standard, e.g., Industry standard (be sure you know the acceptable industry standard), Ford Motor Company, OSHA, ANA Standards of Care, AVMA guidelines, Roberts Rules of Order, etc.
- Following is an example of a properly written performance standard:

  Must use Implied Consent Rule and Good Samaritan laws if patient is unconscious or is a minor without guardian present; otherwise must accede to patient's wishes concerning consent for treatment.

TASK CONDITIONS - TOOLS OF THE TRADE

Conditions are the "stuff" used to perform the task:

- Tools, equipment
- Assisting devices
- Policies/procedures
- Manuals/guidelines
- Special environmental considerations, e.g., on a snowy, icy highway.

Note - These conditions should be provided when evaluating the student's performance of the task.

ENABLING OBJECTIVES - HOW TO GET THERE FROM HERE

Enabling objectives are pieces of the task. They enable the task to be performed. They are commonly called "performance objectives." Competency at the task should be the outcome when all of the enabling objectives are mastered.

Procedure

The simplest way to write enabling objectives is as follows:

- List what the student needs to know in order to complete the task completely (don't forget math, science, and language arts), e.g.:
  - Add whole numbers and decimals
  - Fuel injected engine theory
  - Infection control practices
  - Business letter vs. memo
  - Cleaner's chemical reactions
  - Principles of leverage
- List the physical steps in performing the task.
- Add employability and/or attitudinal considerations, including safety.

Once this list is complete you have a framework for writing the performance objectives. Note the following rules for writing performance objectives:

- They must contain a measurable action verb. Do not use: know learn, understand, appreciate, recognize.
- Each objective should have only one action verb.
- Each objective should contain an action standard, and condition

Please refer to the Performance Objective section of the Resource Guide for further information and assistance in writing enabling objectives.

DEVELOPING A PERFORMANCE GUIDE

A performance guide lists the series of steps that when followed results in the successful completion of the task. Sources for writing the steps of the performance guides include technical literature, worker interviews, observations of task performance, and current experiences. The following are the steps for developing performance guides:

- Locate the starting point and closing point for activities leading to the completion of the task.
- Record those activities in the sequence most commonly followed on the job.
- Note personal safety precautions involved in the activity.
- Avoid recording a detailed explanation of the performance steps.
- Avoid recording explanation of the expected results of the task performance.
- Begin each step of the performance guide with an action verb.
- Identify the tools, equipment, and work aids needed to complete the action requirements as outlined in the performance steps.
- Critique each step of the performance guide. **Note:** Performance guides should reflect what one would see happening and should not include comments of an instructional nature. In this way, performance guides serve as outlines from which instructional materials can be developed with maximum flexibility.

EVALUATION - THE DETERMINANT OF COMPETENCE

The evaluation in outcome-based curriculum is always criterion-reference, i.e., measuring the student's performance against the task standard, NOT against other students.

Because the task is almost always in performance terms, the measure of competence has to be a performance evaluation. So what about the knowledge elements? Knowledge is evaluated through the cognitive enabling objectives.

Prior to evaluating the student on task competence, the instructor will probably choose to evaluate the student through the enabling objectives via:

- Quizzes, exams, paper, worksheets to answer the knowledge objectives
- Lab/shop assignments, demonstrations, projects to answer the skill objectives.
- Check lists and rating scales to answer the employability/ attitudinal objectives.

Please refer to Evaluation section of the Resource Guide.

USING A COMPETENCY PROFILE

A competency profile is a document which reflects the student's progress and areas of competence.

The profile is a list of tasks and a rating of the student's level of competence. It can be used to:

- Monitor a student's progress through a program.
- Accompany a resume to a potential employer
- Serve as an articulation tool by clearly communicating the student's occupational competence.

The secret of a strong competency profile is a good rating scale. As a state, Colorado has chosen to use an outstanding rating scale developed by Peter Hoppen, Instructor at Buena Vista Correctional Facility.

Following is the "Hoppen Scale.":

0 - No exposure to the task

1 - Exposed to the task

2 - Completes the task with supervision

3 - Completes the task without supervision

4 - Can teach the task to others

The strengths of this scale are that:

- It clearly communicates a student's ability at each task
- It is positive in nature
- It allows for the exceptionally skilled student

EXAMPLE OF A COMPETENCY PROFILE

Achieved Entry Level Competencies for Graphics Arts Worker

Vocational Printing Program
Trades Place Area Vocational School
P. O. Box 2017
Buena Vista, Colorado 81211
(303) 395-2404

Student's Name _____

Dates of Enrollment _____

A NOTE TO THE PROSPECTIVE EMPLOYER: The following list of entry level tasks was taken from an Occupational Analysis of Graphic Arts done by Colorado State University in Fort Collins, Colorado.

Rating Scale
0 = No Exposure to Task
1 = Exposure to Task
2 = Completes Task with Supervision
3 = Completes Task without Supervision
4 = Can Teach task to Others

Competency	Level of Achievement
Layout and Paste-Up Activities	
Organize Work Activities	___
Prepare Thumbnail, Rough and Comprehensive Layouts	___
Follow Specifications	___
Make Dummies	___
Scale and Mark Copy for Reproduction Sizes	___
Assemble Camera Ready Copy	___
Make Corrections to Camera Ready Copy	___
Maintain Tools and Equipment	___
Horizontal Process Camera Photography Activities	
Organize Work Activities	___
Set Up Darkroom for Film Processing	___
Scale and Mark Copy for Reproduction Sizes	___
Determine Materials and Exposures to be Used	___
Use Filters When Necessary	___
Produce Line Negatives and Positives	___
Produce Halftone Negatives and Positives	___
Use Contact Printing Frame	___
Produce Duplicate Negatives or Positives	___
Produce Line PMT's	___
Produce Halftone PMT's	___
Produce Spreads and Chokes	___
Process Exposed Files and Materials	___
Inspect and Qualify Processed Materials	___
Maintain Tools and Equipment	___

Competency	Level of Achievement
Striping Activities	
Organize Work Activities	___
Check Negatives Against Dummies or Layouts	___
Prepare Masking Sheets	___
Assemble and Position Images for Single Color Jobs	___
Assemble and Position Images for Multi Color Jobs	___
Open, Inspect and Correct Image Areas	___
Register Additional Flats Where Required for Additional Color or Multiple Exposures	___
Prepare Flats for Step and Repeat Where Necessary	___
Using Masking Film as Required	___
Inspect or Proof Flats	___
Maintain Tools and Equipment	___
Platemaking Activities	
Organize Work Activities	___
Inspect Proofs for Errors and Positioning	___
Follow Specifications	___
Determine Material and Exposures to be Used	___
Expose Plates	___
Process Plates	___
Inspect and Qualify Plates	___
Maintain Tools and Equipment	___

Used with Permission of Peter Hoppen

TEACHING ACTIVITIES

An ideal instructor/manager recognizes the fact that all students bring to the learning environment varying abilities with their needs to achieve a sense of competence. This need for competence is met by different students in different ways, but those who achieve a sense of competence on one learning task tend to seek to achieve new and more difficult tasks.

An outcome-based instructional program can maximize student learning, and the instructor/manager who is product oriented will recognize this fact. The instructor/manager also realizes that students have a need to achieve a sense of competence, and that provided with an effectively managed program, they need not be coerced into working toward worthwhile goals.

The role of the instructor in a outcome-based program

The instructor in a outcome-based system must function in four general roles: manager, advisor, evaluator, and curriculum developer.

- As a manager.

  As a manager in a outcome-based system, the role of the instructor changes from that of the primary source of information, as in the traditional system, to that of a manager of the learning environment. As a manager, the instructor spends time managing instructional materials, time, tools, equipment, supplies, students, and records.

  The instructor guides each student's learning activity; helping, advising, providing feedback and evaluation as students progress through the learning process. The instructor must be alert to any problems which may develop on the way to achievement

of the specified occupational competencies.

The outcome-based instructor introduces each lesson or learning activity packet to each student. The interaction with the student helps clarify what is to be learned, why it is important, how the student will be evaluated, and how much time the student has allotted for mastery of the task. The instructor should have a daily plan which allows time to supervise and evaluate student practice.

- As an advisor.

In the role of advisor the outcome-based instructor will:

1. orient students to outcome-based vocational education
2. assess student's needs relevant to their career goals
3. use time management techniques to help student achieve occupational competence

Since the instructor must operate within fixed time constraints of semesters, weeks, and periods, it is important to make the best use of available time. Time management can be one of the biggest problems a outcome-based instructor will face.

Three types of time management plans are useful in a outcome-based system. They are: the long range plan, the short range plan, and the daily plan.

1. Long range plan

The long range plan is developed in the form of a student performance contract. This contract should be based upon the shortest grading period available. Specific tasks necessary for occupational competency will then be mastered in each grading period.

2. Short range plan

The short range plan is centered around each specific task. Some students will need to have specific times to complete each activity. In some cases, learning guides may need to be broken down and taught by learning activity. The student and instructor agree upon a realistic time to complete each task, and the student is monitored on this basis. Most students will not need such a structured system. They will be able to take a learning guide and work their way through it with only minimal contact with the instructor. Normally, a short range plan will be developed for a week or less. It will help the student make the best use of class time. The plan is developed whenever a student begins a new task.

3. Daily Plan

The daily plan is the most structured and detailed. It is developed at the end of class on the day before it is to be put into action. Each class member must make known his/her needs for the next class period. By developing a daily plan, you can reduce the frustration of having several students approach you at one time asking for evaluation or demonstration. Another favorable feature is the ability to solve simultaneous requests for help or equipment a day in advance. For example, if three students wish to schedule performance checklists using the only piece of equipment available, it is possible to determine who will be evaluated and when. Then with the

instructors help, those who must wait can be guided into useful activities the following day.

Once time management plans are in place, it is important to stick to the plan. Students may initially have some problems anticipating their needs, but with experience, they will learn the valuable skill of anticipating future needs.

- As an evaluator

  The role as an evaluator in a outcome-based system is critical because each student must demonstrate mastery of each task. Mastery of each task must be verified and documented for each student. It is important that each student schedule time for evaluation and that the instructor schedule time each day to record task mastery each day.

- As a curriculum developer

  The role as a curriculum developer has been detailed in a previous section. Remember, to always be alert for updates, revisions, and methods to improve instructional materials.

<u>Classroom Strategies to Improve Instructional Effectiveness</u>

- Complete a occupational analysis to identify the course/program competencies.
- Express the instructional content in terms of measurable student performance objectives.
  a. Statement
  b. Condition
  c. Criteria

- Assess student progress through the use of criterion referenced measures.
  a. Written criterion-referenced exams
  b. Product/performance guides
- Personalize instruction to meet individual student differences.
- Make students aware at the beginning of each course or program of competencies they are expected to achieve.
- Base student evaluations on demonstrated ability to perform competencies under real or simulated job conditions at a minimum level of performance.
- Provide recognition to student of competencies previously learned.
- Place emphasis on the exit requirements of a program or course and not on prerequisites and entry requirements.
- Provide <u>frequent</u> and <u>immediate</u> feedback to students during learning and after mastery of each competency.
- Use reinforcement theory based practices wherein there is an immediate reward for success and no punishment for failure.
- Provide alternative activities for different learning styles.
- Base grades upon competencies completed and set standards rather than upon averages and standard curves.
- Select a strategy that most effectively teaches in the shortest time and:
  1. allows the student to perform most closely to the real life situation.
  2. Is feasible, practical, and affordable
- Move from general to specific - "how to why."
- Spark interest by allowing students to learn something they want to learn first.

- Use flow charts to determine and visually show logical sequence of tasks.
- Teach a sequence of tasks resulting in a completed skill. If students must leave the program early, they will have a completed skill -- not fragments of many skills.
- Teach the "need to know" or most frequently used skills first, then teach the "nice to know" skills.
- Allow each student to experience success based on his/her own skills and abilities.
- Look for abilities, not disabilities.
- Establish short- and long-term goals for each student based on their ability and continued progress.
- Provide a variety of learning activities, and do not be afraid to vary them for different students. Everyone does not learn the same way. There are a variety of ways that people perceive and process information; be aware of them and alter teaching strategies to meet the needs of each individual.
- Use peer assisted learning when appropriate.
- Use student conferences regularly. The conference
  1. Allows student to evaluate their own progress.
  2. Allows the instructor to discuss specific strengths and weaknesses of each student.
  3. Creates a one-to-one dialogue and opens channels of communication between the student and the instructor.
- Use groups where appropriate.
  1. Some students learn better from group presentations/ discussions.
  2. Some students work better in small groups of two or three.

3. Some concepts, skills, attitudes, and problem solving are best taught in a group setting.

- Integrate the affective domain of skills, attitudes and knowledge into class activities.
  1. Students need generalizable skills as well as specific skills.
  2. Coping skills, transition skills, and problem solving skills are becoming more important with the rapid changes in technology and society.
- Use media where it is appropriate. Demonstrations on a flip chart or video tape can be an effective tool.

Remember, outcome-based education is not dependent upon any single instructional strategy. Any strategy that will assist the student in attaining the desired competency is appropriate. Lectures, group demonstrations, or group discussion may be just as effective as self-paced (or individualized) instruction. The goal remains, mastery of tasks by students.

From How to Use V-TECS Products

LESSON PLANNING

There are as many ideas on lesson planning as there are teachers. The important point is: Use a lesson plan, any lesson plan. Many teachers argue against using plans because the subject matter is so well known and lesson planning takes time; however, consider these reasons for using them:

- They help assure that objectives for the day are met.
- They make updating content easier.
- A well written plan can be used by a substitute so that a day of instruction is not lost if the regular teacher is out.
- They help demonstrate "instructional validity."

Types of Plans

There are many types of plans in a wide variety of formats. The best plans help organize an instructional period. The most simple and complete plan is the traditional 4-Step plan:

1. Preparation
2. Presentation
3. Application
4. Evaluation

These steps will be explored in greater detail in the following section.

Preparation

This is preparation of the teacher and the learner.

Teacher Preparation:

- Title of the lesson and objectives are clearly stated.
- Instructional aids are listed, e.g., handouts, transparencies, flip chart, etc.
- Equipment and materials needed for the lesson are listed, e.g., hospital bed, micrometer, dental plaster, etc.

- Resources are listed. These are resources for information to be presented in the lesson.

Student Preparation:

- Attention getting or motivational comments/activities.

  These can be:

  Visual - a cartoon, a product, an experiment, etc.

  Verbal - provocative question, comments, etc.

  Physical - an activity

- Introduction of the content and review of the objectives.

Presentation

This section focuses on information to be presented. It can be presented through activities, demonstration, A-V media, lecture, etc. Key points should be listed.

Application

Application is a plan for students to apply the information in some way:

- Worksheets, workbooks
- Small group activities
- Return demonstrations
- Lab/shop applications, etc.

Evaluation

In this section the teacher determines if the student has met the objectives. It can be done through:

- Assignments (paper, questions, etc.)
- Content review
- Quiz
- Performance on a task
- Various forms of student feedback

Note - The wise teacher makes a note on the lesson plan evaluating preparation and content.

A CHECKLIST FOR ACTION

You may use the following checklist to assist you in competency-based/outcome curriculum development.

TASKS	YES	NO	COMMENTS
A. Competencies, including standards of performance, are based on actual workers' tasks and are identified and stated.			
1. There is a task/competency list that has been validated by representatives of business and industry for the program.			
2. Enabling objectives in the cognitive (knowledge, "What do I know") domain are included in the program.			
3. Performance objectives in the affective (attitude, "How do I feel") domain are included in the program.			
4. Performance objectives in the psychomotor (skills, "What can I do") domain are included in the program.			
5. Performance objectives are stated in measurable terms.			
6. Task/competency lists are updated/ revalidated annually by local experts.			
B. Competencies to be mastered are specified to learners prior to instruction.			
1. A list of tasks/competencies to be mastered is provided to the learner prior to instruction in the program course and/or unit of instruction.			
2. Tasks/competencies are derived from a validated task list.			
C. Criterion-referenced measures are used to determine mastery of competencies.			
1. There is a criterion-referenced measure for each validated task/ competency.			
2. The criterion-referenced measure tests mastery of the skill, knowledge or attitude as stated in the enabling objective.			

TASKS	YES	NO	COMMENTS
3. The criterion referenced testing conditions are the same as stated in the enabling objectives.			
4. Learners are required to perform tasks in a manner similar to performance by incumbents in the occupation for which the learner is receiving training.			
5. Learner achievement and performance is based on the criterion/standard rather than comparison with the performance of other learners.			
D. A system exists for documenting competencies mastered by the learner.			
1. There is a documentation system for tracking learner mastery of tasks/ competencies in the program, course or unit.			
2. The documentation includes the learner's name.			
3. The documentation includes the program title.			
4. The documentation includes the list of tasks/competencies mastered.			
5. The documentation includes the date of demonstrated mastery.			
6. The documentation includes the rating scale or checklist for each mastered task/competency.			
7. The documentation is used for articulation, achievement records, employer information, and reports to parents.			
8. A document listing tasks/competencies mastered is provided to each learner upon exiting the program.			
E. The instructional delivery system is structured to provide for differences in learner characteristics and abilities.			
1. Instructional materials are keyed to the tasks/competencies.			

TASKS	YES	NO	COMMENTS
2. There is a provision for individualized learning opportunities and enrichment activities for each learner as evidenced by the use of learning modules, assignment sheets and/or learning activities packets.			
3. There is provision for immediate feedback/correction strategies.			
4. A variety of learning activities and resources are utilized.			
5. There is provision to allow learners to proceed at their own rate.			
6. Learners are required to demonstrate mastery of each task/competency.			
7. Exit standards, rather than entrance standards, are emphasized.			
8. Entrance procedures allow learners to provide evidence of previously achieved competence.			
9. A system is in place to allow learners to bypass instruction by demonstrating prior mastery of tasks/competencies associated with that instruction.			
10. A system to convert performance of objectives to a conventional grading scale is in place and known to the learners.			

Adapted North Dakota Standards and Criteria, Competency-Based Curriculum.

Resources

How To Use V-TECS Products (Draft). Voctional-Technical Education Consortium of States, 1989.

Outcome-Based Curriculum Procedure Guide. Colorado Community Colleges and Occupational Education System, 1990.

Standards and Criteria for Competency-Based Voctional Education. North Dakota State Board for Vocational Education, N.D.

Task List Verification Techniques. National Network for Curriculum Coordination in Vocational and Technical Education, 1988.

PERFORMANCE OBJECTIVES

PERFORMANCE OBJECTIVES

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COMPONENTS OF OBJECTIVES

The term "objective" is used in many different contexts causing much confusion. In the educational program, objectives are written for the overall educational program, for courses, for units of instruction, and for specific lessons. Also, the word "objective" is used in program evaluation and management contexts to describe what the teacher should accomplish during a specific period of time in relation to a group of students. Throughout this module the term "student performance objective" refers to an action-oriented statement describing what is to be achieved by the students in a vocational setting. Such statements always include three components: condition, performance, and criteria.

* The condition component outlines the circumstances under which the student will be required to perform the activity. This portion of the objective describes (1) the equipment, supplies, and materials the student will be given to work with; (2) what materials the student will be denied access to; (3) the setting the performance must be demonstrated in; (4) the information the student may be provided; (5) the amount of time allowed to accomplish the performance.

* The performance part describes what the student will be doing. It must contain a measurable action verb. This measurable action-oriented verb is used to describe specific performance.

* The standard part of the performance objective describes the level of mastery or degree of proficiency that must be reached in carrying out the performance - in other words, how well the student must be able to do the job. It describes the level of performance required in order for the objectives to be achieved. This part of the objective is probably the most difficult to write, but once it is done, it provides information necessary for planning how to evaluate student performance.

COMPONENTS OF WELL STATED PERFORMANCE OBJECTIVES

CONDITIONS	PERFORMANCE	STANDARD
Givens-allowances/ restrictions		Level of achievement which must be attained
Equipment, supplies or materials student is given to work with	Measurable action verb	Accuracy within a tolerance limit
		Speed-specific time
Materials which the student is denied access	Specific performance element related to the action verb	Percent or number to be achieved
Environment in which the performance must be demonstrated		Maximum number of permissible errors
		Degree of excellence
Information that the student may be provided that will direct the action in a certain direction		Any combination of the above
Point within the program where the performance must be accomplished		

Example:

* Name (p) 20 states (s) given a blank map of the U.S. (c)

RULES FOR PERFORMANCE OBJECTIVES

* Each objective should have all 3 components
* Only one action (performance) should be included in each objective
* All action verbs which describe performance must be measurable

Example Appropriate and Inappropriate Verbs and Statements for Use With Measurable Objectives.

Appropriate (Measurable or Observable)	Inappropriate (Not Measurable or Observable)
Adjust	To learn
Align	To understand
Analyze	To appreciate
Assemble	Has responsibility for...
Calibrate	Is able to do
Clean	Is familiar with
Connect	"When appropriate"
Disassemble	"To instructor's satisfaction"
Fabricate	"As required"
Inspect	"In accordance with prescribed procedures"
Install	Perform procedures correctly
Prepare	Perfrom skill safely
Reassemble	Drill hole accurately
Remove	The student will...
Repair	To be able to...
Replace	Experience
Set-up	Develop
Tune	Feel
Verify	Love

DOMAINS

There are 3 domains of performance objectives: cognitive (knowledge), affective (attitudes and values), and psychomotor (skill) area. These domains are divided into levels or a hierarchy which is called a taxonomy. These levels move from the simple to the complex.

1. Cognitive

   Benjamin Bloom identified 6 levels in the cognitive domain. Remember the cognitive domain contains the certain knowledges necessary to do a particular skill. The knowledge category emphasizes the ability to remember information or facts - merely regurgitation. The comprehension level requires the learner to paraphrase, restate or translate ideas from one to another. The application level requires learners to adapt information and knowledge to new situations. The analysis calls for the learner to dissect or break the total structure into components. The student utilizes the logical thinking process. It requires the learner to identify component parts of a whole and to understand the relationships and the reasons for the relationships. Synthesis requires the "putting together of elements and parts so as to form a whole." This level involves creativity. Evaluation is the highest level and requires the ability to judge the values of ideas, procedures, methods, etc.

   As objectives are written in this domain, many vocational teachers won't go much beyond the application level, however the level is determined by the knowledge skills required for the occupation.

2. Psychomotor

   There are five levels of the psychomotor domain:

   * Imitation-copying
   * Manipulation-selected action, follow through with directions.

* Precision-errors reduced to a minimum.

* Articulation-accuracy, control, speed, time

* Naturalization-become an automatic action ex-driving a car.

Objectives usually aren't written for the naturalization level. Most often students leave a program at the precision or articulation level.

3. Affective

This domain deals primarily with values, attitudes, and beliefs. These objectives are included in vocational education because of their importance in getting and keeping a job. However, these objectives are more difficult to evaluate; since the measure of additional change often is clouded by the difference between stated attitudes and real attitudes. But remember attitude can only be evaluated by observed behavior, whether "real" attitude or not.

* Receiving-no way to check receiving (except by attendance)

* Responding

* Valuing

* Organization

* Characterization

Objectives are usually written up through the valuing level but not beyond.

THE COGNITIVE DOMAIN TAXONOMY

KNOWLEDGE	COMPREHENSION	APPLICATION	ANALYSIS	SYNTHESIS	EVALUATION
(memory, ability to recall, to bring to mind the appropriate material	(ability to apprehend what is being communicated and make use of the idea without relating it to other ideas or material or seeing fullest meaning)	(ability to use ideas, principles, theories in particular and concrete situations)	(ability to break down a communication into constituent parts to make organization of ideas clear)	(ability to put together parts and elements into a unified organization or	(ability to judge the value of ideas, procedures, methods, etc. using appropriate criteria)
			Requires analysis	Requires analysis	Requires analysis
			Requires application	Requires application	Requires application
		Requires comprehension	Requires comprehension	Requires comprehension	Requires comprehension
	Requires knowledge of facts, principles, conditions, etc.	Requires knowledge	Requires knowledge	Requires knowledge	Requires knowledge

NOTE: Many of the same terms can be used in a variety of cognitive domain levels with the level determined by the objective's conditions and standards.

Bloom, Benjamin S., Ed. Taxonomy of Education Objectives. The Classification of Educational Goals Handbook I: Cognitive Domain, David McKay Company, Inc., NY, 1956.

CATEGORIES OF THINKING PROCESS

1. KNOWLEDGE (Recall): Knowledge is defined as the remembering of previously learned material. This may involve the recall of a wide range of material, from specific facts to complete theories, but all that is required is bringing to mind the appropriate information. Knowledge represents the lowest level of learning outcomes in a cognitive domain.

2. COMPREHENSION (Understand): Comprehension is defined as the ability to grasp the meaning of material. This may be shown by translating material from one form to another (words to numbers), by interpreting material (explaining or effects). These learning outcomes go one step beyond the simple remembering of material, and represent the lowest level of understanding.

   Illustrative Action Terms: Restate, discuss, describe, explain, tell, express, locate, report, review.

3. APPLICATION (Use): Application refers to the ability to use learned material in new and concrete situations. This may include the application of such things as rules, methods, concepts, principles, laws, and theories. Learning outcomes in this area require a higher level of understanding than those under comprehension.

   Illustrative Action Terms: Translate, interpret, apply, use, employ, dramatize, demonstrate, practice, illustrate, operate, schedule, shop, sketch.

4. ANALYSIS (Take apart): Analysis refers to the ability to break down material into its component parts so that its organizational structure may be understood. This may include the identification of the parts, analysis of the relationship between parts and recognition of the organizational principles involved. Learning outcomes here represent a higher intellectual level than comprehension and application because they require an understanding of both the content and the structural realm of the material.

   Illustrative Action Terms: Distinguish, analyze, differentiate, appraise, calculate, experiment, test, compare, contrast, diagram, inspect, debate, inventory, question, relate, solve, examine, criticize.

5. SYNTHESIS (Create new): Synthesis refers to the ability to put parts together to make a new whole. This may involve the production of a unique communication (theme or speech), a plan of operations (research proposal), or a set of abstract relations (a help for classifying information). Learning outcomes in this area stress creative behavior, with major emphasis on the formulation of new patterns or structures.

Illustrative Action Terms: Compose, plan, propose, design, formulate, arrange, assemble, prepare, collect, construct, compose, create, set up, organize, manage.

LEVELS OF THE COGNITIVE VARIABLE

Levels of the Cognitive Variable emphasizing mental processes begin with the concrete behavior of knowledge and continue through the more abstract levels of analysis and synthesis. These levels are defined as:

1. KNOWLEDGE — Involves the recognition and recall of facts (i.e., defining terms, recalling names, dates, persons, identifying words, etc.).

2. COMPREHENSION — The learner interprets, translates, summarizes, or paraphrases given materials. The person can organize the material into another language or form of communication (i.e., reading a book or musical scores, grasping the thought of material studied, ability to describe something in one's own words, etc.).

3. APPLICATION — Involves the use of material in a situation in which it was originally learned (i.e., the use of abstract ideas, principles, or theories in problem-solving).

4. ANALYSIS — Involves separating a complex entity into its parts, drawing comparisons and relationships between the elements (i.e., ability to recognize assumptions, to distinguish cause and effect relationships, reorganization of biases or points of view, etc.).

5. SYNTHESIS — Involves combining elements to form a new original entity. It involves a process of working with pieces, parts, elements, etc., and arranging them in a structure that was not clearly evidenced before (i.e., ability to produce a play, music, art forms, design products, or formulate solutions).

6. EVALUATION — Involves acts of decision-making, judging, or selecting based on a given set of criteria. These criteria may be objective or subjective (i.e., ability to indicate fallacies, compare a work or idea with known standards, etc.).

THE PSYCHOMOTOR DOMAIN TAXONOMY

				NATURALIZATION
			ARTICULATION	(action, performed without hesitation, leading to automatic and smooth performance)
		PRECISION	(performance involves accuracy and control plus elements of speed and time)	Requires articulation
	MANIPULATION	(reproduction of performance control, and errors reduced to a minimum	Requires precision	Requires precision
IMITATION	(Selected action and fixation through practice following instructional directions)	Requires manipulation	Requires manipulation	Requires manipulation
(observes, followed by overt performance and capacity to repeat it)	Requires imitation	Requires imitation	Requires imitation	Requires imitation

NOTE: Many of the same terms can be used in all levels of the psychomotor domain, but the level is determined by the conditions and standards of the behaviorally-stated objective.

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PSYCHOMOTOR LEVELS

The levels of the Psychomotor Variable of behavior are based on the concept of coordination. These behaviors include muscular action and require neuromuscular coordination. The levels are defined as:

1. IMITATION — When the learner is exposed to an observable action, he begins to make covert imitation of that action. Such covert behavior appears to be the starting point in the growth of psychomotor skill. This is then followed by overt performance of an act and capacity to repeat it. The performance, however, lacks neuro muscular coordination or control, and hence is generally in a crude and imperfect form (i.e., impulse, overt repetition).

2. MANIPULATION — Emphasizes the development of skill in following directions, performing of selected action, and fixation of performance through necessary practice. At this level, the learner is capable of performing an act according to instruction rather than just on the basis of observation as in the case at the level of imitation (i.e., following directions.)

3. PRECISION — The proficiency of performance reaches a higher level of refinement in reproducing a given act. The learner performs the skill independent of the model or a set of directions. Accuracy, proportion, and exactness in performance become significant (i.e., reproduction, control, errors reduced to a minimum).

4. ARTICULATION — Emphasizes the coordination of a series of acts by establishing appropriate sequence and accomplishing harmony or internal consistency among different acts (i.e., performance involves accuracy and control plus elements of speed and time).

5. NATURALIZATION — A high level of proficiency in the skill of performance of a single act is required. The behavior is performed with the least expenditure of psychic energy. The act is routinized to such an extent that it results in automatic and spontaneous response (i.e., performance becomes natural and smooth).

THE AFFECTIVE DOMAIN TAXONOMY

				CHARACTERIZATION
			ORGANIZATION	(integrating, generalizes certain values into controlling tendencies; later integrates them into a total philosophy or world view)
		VALUING	(organizes values; determines inter-relationships; establishes some as dominant and pervasive)	Requires organization values
	RESPONDING	(accepts worth of a thing, an idea or a behavior; prefers it; acts to further it as a value; develops a commitment to it)	Requires development of values	Requires development of values
RECEIVING	(makes response at first obediently, later, willingly and with satisfaction)			
(attending, becomes aware of an idea, process or thing; is willing to learn and to try a particular behavior)	Requires a response	Requires a response	Requires a response	Requires a response
	Begins with attending	Begins with attending	Begins with attending	Begins with attending

NOTE: Many of the same terms can be used in a variety of affective domain levels with the level determined by the objectives' conditions and standards.

Krathwohl, David R., Bloom, Benjamin S. and Masia, Bertram B. Taxonomy of Educational Objectives. The Classification of Educational Goals Handbook II: Affective Domain. David McKay Company, Inc., NY, 1964.

LEVELS OF THE AFFECTIVE VARIABLES

Affective behaviors are generally identified as the interest, attitudes, values, appreciations, and adjustments of the individual. The affective behaviors, emphasizing the emotional processes, begin with the simple behaviors of receiving and responding and continue through the complex process of characterization. The levels of affective behavior are defined as:

1.	RECEIVE	The learner is aware of, or passively attending to certain phenomena and stimuli (i.e., listening, being attentive to, etc.).
2.	RESPOND	The learner complies to given expectations by attending or reacting to certain stimuli or phenomena (i.e., obeys or participates as expected, etc.).
3.	VALUE	The learner displays behavior consistent with a single belief or attitude in situations where he is not forced to comply or obey (i.e., demonstrates a definite preference, displays a high degree of certainly and conviction, etc.).
4.	ORGANIZATION	The learner is committed to a set of values as he displays or communicates his beliefs or values (i.e., develops a rationale for a set of values, makes judgments about sets of values).
5.	CHARACTERIZATION	The total behavior of the learner is consistent with the values he has internalized (i.e., develops a consistent philosophy of life, exhibits respect for the worth and dignity of human beings, etc.).

A CATEGORIZED "SHOPPING-LIST" OF VERBS
USEFUL FOR MAKING OBJECTIVES MORE PRECISE

SIMPLE TASKS

attend	differentiate	label	point
choose	discriminate	list	provide
collect	distinguish	mark	recall
complete	distribute	match	repeat
copy	duplicate	name	select
count	find	note	state
define	identify	omit	tally
describe	imitate	order	tell
designate	indicate	place	underline
detect	isolate		

STUDY SKILLS

arrange	consider	itemize	return
attempt	diagram	locate	search
categorize	document	map	signify
chart	find	organize	sort
cite	follow	quote	suggest
circle	formulate	record	support
classify	gather	relate	underline
consider	include	reproduce	volunteer

ANALYSIS SKILLS

analyze	criticize	generate	present
appraise	deduce	induce	save
combine	defend	infer	shorten
compare	evaluate	paraphrase	structure
conclude	explain	plan	switch
contrast	formulate		

SYNTHESIS SKILLS

alter	generalize	recombine	restate
change	modify	reconstruct	restructure
design	paraphrase	regroup	retell
develop	predict	rename	signify
discover	propose	reorganize	simplify
expand	question	reorder	synthesize
extend	rearrange	rephrase	systematize

GENERAL APPLICATIONS

Arts and Crafts

assemble
blend
brush
build
carve
color
construct
crush
cut
dab
dot
draw
drill
finish
fit
fix
fold
form
frame
grind
hammer
handle
heat
illustrate
make
melt
mend
mix
mold
nail
paint
paste
pat
position
pour
press
procedure
roll
rub
sand
saw
sculpt
sew
shake
sharpen
sketch
smooth
stamp
stick
stir
trace
trim
varnish
wipe
wrap

Drama

act
clasp
correct
cross
direct
display
emit
enter
exit
express
leave
move
pantomime
pass
perform
proceed
respond
show
start
turn

Language

abbreviate
accent
alphabetize
argue
articulate
capitalize
edit
hyphenate
indent
outline
print
pronounce
punctuate
read
recite
speak
spell
state
summarize
syllabicate
translate
type
verbalize
write

Mathematical

add
bisect
calculate
check
compound
compute
count
derive
divide
estimate
extrapolate
extract
graph
group
integrate
interpolate
measure
multiply
number
plot
prove
reduce
solve
square
subtract
tabulate
tally
verify

Music

blow
bow
clap
compose
conduct
finger
harmonize
hum
mute
plan
pluck
practice
sing
strum
tap
whistle

Physical

arch
bat
bend
carry
catch
chase
climb
coach
coordinate
critique
float
grip
hit
hop
jump
kick
knock
lift
march
perform
pitch
run
score
skate
ski
skip
somersault
stand
stretch
strike
swim
swing
throw
toss

Science

calibrate
compound
connect
convert
decrease
demonstrate
dissect
graft
grow
increase
insert
lengthen
light
limit
manipulate
nurture
operate
plant
prepare
reduce
remove
replace
report
reset
set
specify
straighten
time
transfer
weigh

Social

accept
agree
aid
allow
answer
buy
communicate
compliment
contribute
cooperate
disagree
discuss
excuse
forgive
greet
guide
help
inform
interact
invite
join
laugh
lend
meet
offer
participate
permit
praise
react
relate
serve
share
smile
supply
talk
thank
volunteer
vote

A CATEGORIZED "SHOPPING-LIST" OF VERBS
USEFUL FOR MAKING OBJECTIVES MORE PRECISE
Action Verbs With Value for the Affective Domain

accepts
acts
adopts
advocates
annotates
answers
argues (a position)
asks
assists
attempts
challenges
chooses
complies
conforms
consults
criticizes
defends
delays (response)
describes
designs
differentiates
discusses
evaluates
follows
gathers (information)
generalizes
given
greets
helps
integrates
investigates
joins
keeps (preserves)
listens
obeys
objects (to an idea)
offers
organizes
participates
perseveres
persists
points to
praises
prepares
proposes
qualifies
querdes
questions
recommends
rejects
relates
replies
revises
seeks
shares
sits erect
sleeps
solves
specifics
spends (money)
subscribes
submits
suggests
supports
synthesizes
tests
uses
verifies
visits
volunteers
weights (judges)
yawns

FROM: WRITING PERFORMANCE OBJECTIVES by LOIS BENNETT, 1980

MEASURABLE OBJECTIVE WORDS

All objectives to be effective must be measurable in a behavior pattern.

Words you might use when writing objectives:

KNOWLEDGE	ANALYSIS	EVALUATION
define	distinguish	judge
memorize	analyze	appraise
repeat	differentiate	evaluate
record	appraise	rate
list	calculate	compare
recall	experiment	value
name	test	revise
relate	compare	score
	contrast	select
COMPREHENSION	criticize	choose
	diagram	assess
restate	inspect	estimate
discuss	debate	measure
describe	inventory	inspect
	question	
explain	relate	
express	solve	
	examine	
locate		
report	SYNTHESIS	
review		
tell	compose	
	plan	
APPLICATION	propose	
	design	
translate	formulate	
interpret	arrange	
apply	assemble	
employ	collect	
use	construct	
demonstrate	create	
practice	design	
illustrate	set up	
operate	organize	
schedule	manage	
shop	prepare	
sketch		

SUGGESTED MODEL FOR IDENTIFYING AND DESCRIBING SPECIFIC

BEHAVIOR ON THE BASIS OF THE DEVELOPING LEVELS OF COGNITION

LESS COMPLEX

KNOWLEDGE

Counts	Indicates	Points to	Recalls	Selects
Defines	Labels	Produces	Recites	Tabulates
Describes	Matches	Quotes		Traces
Draws	Names	Reads	Records	Writes
	Outlines			

COMPREHENSION

Associates	Converts	Estimates	Generalizes	Interpolates
Compares	Defends	Explains	Gives Examples	Rewrites
Computes	Differentiates	Extends	Infers	Summarizes
Contrasts	Distinguishes	Extrapolates	Interprets	Translates

COGNITIVE CATEGORIES

APPLICATION

Applies	Demonstrates	Illustrates	Practices	Shows
Calculates	Discovers	Manipulates	Predicts	Solves
Changes	Employs	Modifies	Prepares	Uses
Classifies	Examines	Operates	Relates	Utilize
Completes				

ANALYSIS

Analyzes	Constructs	Diagrams	Groups	Separates
Breaks down	Detects	Discriminates	Points Out	Transforms

MORE COMPLEX

SYNTHESIS

Arranges	Creates	Generalizes	Prescribes	Reorganizes
Categorizes	Designs	Generates	Proposes	Revises
Combines	Develops	Integrates	Rearranges	Specifies
Compiles	Devises	Organizes	Reconstructs	Tells
Composes	Formulates	Plans		

EVALUATION

Appraises	Criticizes	Grades	Justifies	Selects
Assesses	Critiques	Judges	Ranks	Supports
Compares	Determines	Measures	Rates	Tests
Concludes	Evaluates			

HELPFUL VERBS

When attempting to help students use higher level thought processes, the teacher frequently needs words that elicit the desired process. The following list of verbs expresses the various aforementioned levels of

KNOWLEDGE --

list	define	memorize
name	repeat	recall
	record	relate

COMPREHENSION --

tell	restate	
report	discuss	express
locate	describe	
review	explain	

APPLICATION --

use	operate	illustrate
show	sketch	translate
apply	schedule	demonstrate
employ	practice	dramatize
interpret		

ANALYSIS --

solve	compare	differentiate
test	contrast	distinguish
relate	appraise	calculate
debate	analyze	experience
inspect	examine	inventory
diagram	criticize	question

SYNTHESIS --

plan	compose	construct
design	propose	formulate
create	set up	organize
manage	collect	assemble
arrange	prepare	

EVALUATION --

rate	assess	estimate
score	choose	appraise
value	compare	evaluate
revise	select	measure
judge		

EVALUATION TOOLS

EVALUATION TOOLS

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Psychomotor Evaluation	23
Affective Evaluation	37

DEFINITION OF TERMS:

AFFECTIVE TEST ITEM. An item dealing with the measurement of attitudes or values; items which usually require an instructor to observe student behavior.

COGNITIVE. Skills which emphasize the recall comprehension, application, analysis, synthesis, and evaluation of knowledge and development of intellectual abilities.

COGNITIVE TEST ITEM. An item pertaining to knowledge which is generally measured by student performance on either written or verbal tests.

COMPETENCY. Ability or desired outcome. A standard of performance which is required in order for a worker to perform an occupational task.

CRITERION-REFERENCED TESTS. A test designed to measure a learner's performance against predetermined criteria built into the task anaysis or objectives.

DISTRACTOR. An incorrect response to a multiple-choice or true/false test item.

DUTY. A cluster of related tasks performed by incumbent workers in an occupational domain.

NORM-REFERENCED TEST. A test on which the score of an examinee is interpreted in terms of the distribution of scores of other examinees.

PERFORMANCE OBJECTIVE. An educational directive for instruction and evaluation.

PSYCHOMOTOR. Skills which emphasize manipulation of materials or tools.

PSYCHOMOTOR TEST ITEM. A test item that measures a specific performance requiring some manipulation of materials or objects or an action using neuro-muscular coordination.

STEM. That portion of a multiple-choice or true/false test item in which the statement or question is presented.

TASK. A unit of work with a definite beginning and ending which is measurable and observable. A task consists of two or more definite steps.

TASK LIST. A list of tasks performed by incumbents in a specific occupation.

THE COGNITIVE DOMAIN TAXONOMY

KNOWLEDGE	COMPREHENSION	APPLICATION	ANALYSIS	SYNTHESIS	EVALUATION
(memory, ability to recall, to bring to mind the appropriate material	(ability to apprehend what is being communicated and make use of the idea without relating it to other ideas or material or seeing fullest meaning)	(ability to use ideas, principles, theories in particular and concrete situations)	(ability to break down a communication into constituent parts to make organization of ideas clear)	(ability to put together parts and elements into a unified organization or	(ability to judge the value of ideas, procedures, methods, etc. using appropriate criteria)
			Requires analysis	Requires analysis	Requires analysis
			Requires application	Requires application	Requires application
		Requires comprehension	Requires comprehension	Requires comprehension	Requires comprehension
	Requires knowledge of facts, principles, conditions, etc.	Requires knowledge	Requires knowledge	Requires knowledge	Requires knowledge

NOTE: Many of the same terms can be used in a variety of cognitive domain levels with the level determined by the objective's conditions and standards.

Bloom, Benjamin S., Ed. Taxonomy of Education Objectives. The Classification of Educational Goals Handbook I: Cognitive Domain, David McKay Company, Inc., NY, 1956.

MEASURABLE OBJECTIVE WORDS

All objectives to be effective must be measurable in a behavior pattern.

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KNOWLEDGE	ANALYSIS	EVALUATION
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list	calculate	compare
recall	experiment	value
name	test	revise
relate	compare	score
	contrast	select
COMPREHENSION	criticize	choose
	diagram	assess
restate	inspect	estimate
discuss	debate	measure
describe	inventory	inspect
	question	
explain	relate	
express	solve	
	examine	
locate		
report	SYNTHESIS	
review		
tell	compose	
	plan	
APPLICATION	propose	
	design	
translate	formulate	
interpret	arrange	
apply	assemble	
employ	collect	
use	construct	
demonstrate	create	
practice	design	
illustrate	set up	
operate	organize	
schedule	manage	
shop	prepare	
sketch		

THE PSYCHOMOTOR DOMAIN TAXONOMY

				NATURALIZATION (action, performed without hesitation, leading to automatic and smooth performance)
			ARTICULATION (performance involves accuracy and control plus elements of speed and time)	Requires articulation
	MANIPULATION (Selected action and fixation through practice following instructional directions)	PRECISION (reproduction of performance control, and errors reduced to a minimum	Requires precision	Requires precision
IMITATION (observes, followed by overt performance and capacity to repeat it)	Requires manipulation	Requires manipulation	Requires manipulation	Requires manipulation
	Requires imitation	Requires imitation	Requires imitation	Requires imitation

NOTE: Many of the same terms can be used in all levels of the psychomotor domain, but the level is determined by the conditions and standards of the behaviorally-stated objective.

Dave, R. H., National Institute of Education, NIE Building, Nehrauli Road, New Delhi, India.

THE AFFECTIVE DOMAIN TAXONOMY

				CHARACTERIZATION
			ORGANIZATION	(integrating, generalizes certain values into controlling tendencies; later integrates them into a total philosophy or world view)
		VALUING	(organizes values; determines inter-relationships; establishes some as dominant and pervasive)	Requires organization values
	RESPONDING	(accepts worth of a thing, an idea or a behavior; prefers it; acts to further it as a value; develops a commitment to it)	Requires development of values	Requires development of values
RECEIVING	(makes response at first obediently, later, willingly and with satisfaction)	Requires a response	Requires a response	Requires a response
(attending, becomes aware of an idea, process or thing; is willing to learn and to try a particular behavior)	Begins with attending	Begins with attending	Begins with attending	Begins with attending

NOTE: Many of the same terms can be used in a variety of affective domain levels with the level determined by the objectives' conditions and standards.

Krathwohl, David R., Bloom, Benjamin S. and Masia, Bertram B. Taxonomy of Educational Objectives. The Classification of Educational Goals Handbook II: Affective Domain. David McKay Company, Inc., NY, 1964.

COGNITIVE EVALUATION

TEST CONSTRUCTION

TEST CONSTRUCTION

Essential elements of test include:

Validity: The extent to which a test measures what it is supposed to measure. Validity is defined in terms of its purpose. "What is the purpose of the test?"

Steps toward valid tests

1. Review student performance objectives, determining domain and level (use taxonomies). Are they at more than one level?
2. Match performance objective domain and level with appropriate testing approach and item(s) e.g. cognitive/comprehension with completion/short answer exam or cognitive/synthesis with case test items.
3. Get verification from consultant.
4. Insure that test is reliable.

Reliability: The extent to which a test measures accurately and consistently.

Reliability is a necessary but not sufficient condition for test validity.

Which "measuring stick" will you use?

Steps toward reliable tests

1. Tests must be long enough to include an unbiased (representative) sample of test items but not so long that most students do not have time to complete it or that it becomes a reading test.
2. Test items should be clear and not ambiguous.
3. Simple and straight forward instructions for taking the test.

4. Objective score utilizing an inflexible key.
5. Students should be emotionally and physically "ready" to take exam.
6. Environment should be quiet and free from distractions.
7. Use of statistical measures of reliability (test-retest, alternative form, alternative form-delayed).
8. Improving discrimination power (difficulty) of item tends to increase reliability. However, item must still be matched to objectives or validity will suffer.

Objectivity: The quality of consistent interpretation in scoring or answering test items.

Steps toward objective tests.

1. Develop an inflexible grading key prior to giving the test. Even though it may be difficult for essay and case study/problem solving items, develop a formula for full/partial credit responses. Clarify in the item the effect of spelling, grammar, etc. Add grading key to outline.
2. Provide clear, explicit, and complete directions for only a single interpretation. Be willing to clarify directions or test items in a non-disruptive consistent manner.

Discrimination: the quality of a test which reveals the progress each student made toward achieving the objectives. A class with heterogeneous ability should reveal heterogeneous scores (variability as measured by standard deviation).

Steps toward Discrimination

1. Perform an item analysis comparing performance of students with upper and lower scores. Remove non-discriminating items which are too easy or confusing.

2. Use table of specifications to insure that test has questions of different levels in accordance with content dimension of course.

Comprehensiveness: The quality of good test in which each student performance objective is represented by test items.

Steps toward comprehensiveness

1. Each objective is adequately evaluated (two or more items).
2. Test is not too long (don't fatigue students taking an exam).

CLASSROOM EVALUATION

It is important to remember that constructing and administering tests should be a positive experience for your students and for you as a teacher. If you want to know if your students have learned what you expected, it is necessary to test their cognitive (knowledge) level through some form of written test: to determine their performance level through observing their skills, etc. in laboratory setting, and to determine their attitudes about their occupational by observing their behavior.

* Cognitive - in the process of evaluating student achievement in this domain it is important to determine what level of knowledge is to be evaluated and then determine what evaluation technique(s) (short answer, essay, etc.) to use to measure student progress toward achieving the objective.
* Performance - psychomotor objectives involve motor or skill-centered activities. This type of objective typically involves following a particular sequence of procedures; performing each procedure to a certain level of competency; and/or creating an end product or

result which meets certain criteria. Students are usually evaluated through observations. The performance objectives also serve as basis for developing clinical objectives and evaluation instruments.

* Affective - a good program of vocational training needs to not only be concerned with knowledges and skills but it should also aid students in developing a set of attitudes and a system of values about themselves and their work that will help them become competent and satisfied occupational workers.

Each kind of test item can be constructed affectively if you are aware of each item's a) best applications; b) weaknesses; c) suggestions for construction.

TYPES OF TEST ITEMS

IN THE COGNITIVE DOMAIN

OBJECTIVE ITEMS

* True/False
* Matching
* Completion
* Identification
* Order/Arrangement
* Multiple Choice

Usually Lower level items:
Knowledge Comprehension

Usually higher level items:
Comprehension - Analysis

SUBJECTIVE ITEMS

* Short answer
* Essay
* Case Study
* Problem Solving

Can evaluate through the entire cognitive domain.

ANALYSIS OF TYPES OF QUESTIONS AND TESTS

COGNITIVE DOMAIN

1. TRUE-FALSE

Scoring Method - Score = Rights minus the wrongs

A. BEST APPLICATIONS AND PURPOSES

1. To check technical knowledge
2. To check knowledge of procedures
3. "modified" item: "If the statement is false correct the statement in the space provided under each statement."

B. WEAKNESSES OR LIMITATIONS

1. Difficulty in forming questions
2. Encourages guessing

C. SUGGESTIONS FOR IMPROVEMENT

1. Avoid tell-tale clues such as--
   a. Never
   b. Sometimes
   c. Always
   d. Often
   e. Usually
2. Use "T", "F", and "D" for responses: "D" = Don't Know
3. Explain scoring system.
4. Provide unequal number of "T" and "F".
5. Write wrong questions first.
6. All statements are entirely true or entirely false.
7. No trivial details are used to make any of the statements false.
8. Statements are concise without more elaboration than is necessary to give clear meaning.
9. The statements have not been quoted from a textbook.
10. Statements avoid using specific determiners that signal the answers.
11. Statements that are positive rather than negative terms.
12. Authorities are quoted when the item contains a controversial issue.
13. A pattern of responses is avoided in the items.
14. The responses for the group of items are written in a manner that makes scoring easy (open column to the left).

2. MULTIPLE CHOICE

Scoring Method - Score = $R - \frac{W}{N-1}$

R = Rights, W = Wrongs, N = Number of

A. BEST APPLICATIONS AND PURPOSES

1. To check nomenclature
2. To check functions of parts
3. To check judgment
4. To induce thinking

B. WEAKNESSES OR LIMITATIONS

1. Difficulty in writing
2. Difficulty of interpreting best answer

C. SUGGESTIONS FOR IMPROVEMENT

1. Use 4 or more responses.
2. See that all responses are sensible.
3. State response-method clearly.
4. Avoid patterns in placement of correct answer.
5. Provide same number of choices for each question.
6. Essential question or problem is stated in the stem of each line.
7. The response choices for each item are grammatically correct.
8. Authorities are quoted when the problem contains controversial opinions.
9. There are no ambiguous statements in the stems or the choices.
10. All the choices for each item are feasible.
11. The items are constructed to measure the level of knowledge specified in the objectives.
12. The items are written at the language level of the students.
13. The items are constructed to measure the level of knowledge specified in the objectives.
14. If the student is asked to select the correct answer, there should be only one correct response listed. If several responses are suitable, the instructions should indicate so.
15. The incorrect options should be reasonable. If they are not, the student will arrive at the correct response by the process of elimination, and not because he knows the answers.
16. Question, followed by an option is usually preferable, since the meaning of the question is more apt to be made clear in the questions form than in the statement form.

17. Include as much as possible of the item in the stem. It takes less time for the student to read along the stem followed by several short options than to read a short stem followed by several lengthy options.
18. Beware of grammatical clues. For an example, a verb form in the stem can be matched to a similar form in the correct option - or the use of "a" or "an" can be matched with the correct option.
19. Beware of clues from the length of the options. There is a tendency for the correct answer to be longer than the incorrect answer, since the correct answers require qualification.

3. MATCHING

Scoring Method - Usually 20 or more points for each pair correctly matched.

A. BEST APPLICATIONS AND PURPOSES

1. To check nomenclature.
2. To check functions of parts.
3. To check relationships.
4. To promote thinking.

B. WEAKNESSES OR LIMITATIONS

1. Difficulty in avoiding misinterpretation of certain items.
2. Requires much "hunt and find."

C. SUGGESTIONS FOR IMPROVEMENT

1. Provide uneven or unmatched columns, or a few non-matching pairs.
2. Limit each section to 15 or 20 pairs.
3. Write first in correct order, then mix one column.
4. Only similar premises and similar responses are grouped within the item.
5. Premises are arranged for maximum clarity and convenience for the student.
6. The responses are alphabetically or chronologically arranged.
7. Directions clearly indicate the basis for matching.
8. Real materials, pictures, drawings, or bottles are used for the practical.
9. All the premises and responses are on one page.
10. There are more responses than premises, or single responses can be used to answer more than one premise.

4. COMPLETION

Scoring Method - Usually 1 or 2 points for each blank correctly filled in.

A. BEST APPLICATIONS AND PURPOSES

1. To check nomenclature.
2. To check functions of parts.
3. To check relationships.
4. To promote thinking.

B. WEAKNESSES OR LIMITATIONS

1. Emphasizes memory.
2. Stresses speed in reading.

C. SUGGESTIONS FOR IMPROVEMENT

1. Keep blanks near end of sentence.
2. Write complete statements and then remove words.
3. Make clear, concise statements.
4. Limit the number of blocks in any one sentence.
5. Require correct terms in all responses.
6. Only specific words are omitted in complete sentence items.
7. Enough clues are left in incomplete sentence items so that the required responses make sense to the students.
8. There are no grammatical clues to reveal the correct responses or answers.
9. If incomplete sentences are used all blanks are the same length.
10. The omitted phrases or words are of comparable importance among the items.
11. Any question asked is explicit enough to provoke the correct type of response.
12. Direct quotes form the textbook are avoided.

5. IDENTIFICATION

Scoring Method - Usually 1 or more points for each correct identification.

A. BEST APPLICATIONS AND PURPOSES

1. To check nomenclature.
2. To check function of parts.

B. WEAKNESSES OR LIMITATIONS

1. Requires memory rather than thought.

C. SUGGESTIONS FOR IMPROVEMENT

1. Restrict to one page.
2. If pictures are used be sure they are clear.

6. ORDER-ARRANGEMENT

Scoring Method - Varied and difficult; partial credit sometimes given.

A. BEST APPLICATIONS AND PURPOSES

1. To check knowledge of procedures.
2. To check thought and technical knowledge.

B. WEAKNESSES OR LIMITATION

1. Difficulty in scoring.
2. Difficulty in stating.

C. SUGGESTIONS FOR IMPROVEMENT

1. Write first in correct order, then mix.
2. Provide clear response method.
3. State problem definitely.
4. Require that responses follow the procedures taught. Page 57.

7. ORAL

Scoring Method - Usually 5 or 10 points for each question correctly answered; questions are sometimes "weighted"; partial credit usually given.

A. BEST APPLICATIONS AND PURPOSES

1. To discover way learner attacks question or problem.
2. To encourage some learners to more complete expression than usual.
3. To promote thinking.
4. Feedback of attitudes and feelings.
5. Assess competence and ease of interpersonal communicating skills.

B. WEAKNESSES OR LIMITATIONS

1. Speaking ability rather than knowledge may influence score.
2. Lacks objectivity.
3. Easy for learner to "ramble" when answering.
4. Difficult to score.

C. SUGGESTIONS FOR IMPROVEMENT

1. Make questions clear and specific.
2. Have in mind the basic points required in correct answer.
3. Limit score of each question.
4. Weight question in scoring.
5. Items should be designed to elicit only the correct responses.

6. States so that the responses will measure achievement of the objectives.
7. Arranges in a logical sequence.

8. SHORT ANSWER

Scoring Method - Usually 1 or more points per question; partial credit seldom given.

A. BEST APPLICATIONS AND PURPOSES

1. To check technical knowledge.
2. To check nomenclature.
3. To promote thinking.
4. To give a thorough check of material covered.

B. WEAKNESSES OR LIMITATIONS

1. Requires little writing ability.
2. Difficulty in writing definite and concise questions.

C. SUGGESTIONS FOR IMPROVEMENT

1. Form definite, short concise, clear questions.
2. Avoid suggestive questions.
3. Avoid suggesting answer to a later or another question.

9. ESSAY

Scoring Method - Usually 5 or 10 points for each question correctly answered; questions are sometimes "weighted"; partial credit usually given.

A. BEST APPLICATIONS AND PURPOSES

1. To promote thinking (higher levels on hierarchy).
2. To locate writing ability
   a. Spelling
   b. Handwriting
   c. Neatness
   d. Phraseology
3. The essay question demands a response.
4. The student has an opportunity to demonstrate his/her ability.
5. Select the information the answer calls for.
6. The student can express personal convictions and interpretations.
7. The student is encouraged to use initiative in responding to questions.
8. The essay test largely eliminates the possibility of guessing.
9. The essay test is relatively easy to prepare.
10. The essay examination is best used to diagnose the learning difficulty of individual students, particularly regarding depth of understanding and the application of knowledge.

11. May be used to assess learner's attitudes and feelings.

B. WEAKNESSES OR LIMITATIONS

1. Weak objectivity (usually).
2. Weak reliability (usually).
3. Penalized the non-writer.
4. In an essay examination students tend to bluff their way through any question they are not prepared to answer.
5. A "halo" effect, based on student's previous performance often shows up in grading.
6. Handwriting may effect the grading.
7. Spelling and grammatical errors influence the rating of an essay.
8. Essay examinations are difficult and time consuming to grade.
9. A limited number of questions can be asked, thus limiting the subject matter which can be covered in a single examination.
10. Essay tests are often quickly and carelessly constructed.
11. Answers to essay questions are seldom simply right or wrong.

C. SUGGESTIONS FOR IMPROVEMENT

1. Limit score of question.
2. Avoid suggestive questions.
3. Make questions clear and definite.
4. Require a rough sketch when possible.
5. Weight question in scoring.
6. The language in each item is precise and ambiguous.
7. Problems or tasks require students to use higher levels of cognition.
8. Problems or tasks that students are asked to do are clearly stated.
9. Any special conditions are stated.
10. The items avoid the open book situation.
11. The items clarify any additional corrections needed beyond the general set of directions.
12. Limit question which may be omitted.

10. CASE STUDY/PROBLEM SOLVING ITEM

Scoring Method - Usually 5 or 10 points for each question correctly answered; questions are sometimes "weighted"; partial credit usually given.

A. BEST APPLICATIONS AND PURPOSES

1. Calls upon students to place themselves in a situation or to react to a situation in which their prior learning is required to solve the problem or evaluate the situation.
2. The case study problem-solving statement could ask the student to predict trends or to make inferences of consequences (high-level types of knowing).

3. Used when the objective is to teach the application of principles, generalizations, concepts.
4. Requires students to apply what they have learned.
5. Stress the ability of students to analyze-to break down materials into it's parts, to take the relationships of the parts, and recognize the organizational principles of the structure as a whole.
6. Used as means of evaluating student ability to judge (evaluate or appraise) ideas, methods, materials, solutions, etc.

B. WEAKNESSES OR LIMITATIONS

1. The construction of case/study problem-solving items and the development of the key for grading involve considerable time and effort.
2. Time required to score.
3. Weak objectivity.
4. Low reliability.
5. Penalizes the non-writer
6. Limited coverage of area to be tested.

C. SUGGESTIONS FOR IMPROVEMENT

1. The statement of the case study/problem-solving item should describe a situation, what the student is to do, and the end expectations.
2. The situation developed is directed toward evaluating achievement of the student performance objective.
3. The problem is practical and realistic.
4. The problem is worded at the student's comprehension level.
5. The problem requires the student to comprehend prior learning, and to apply that learning, analyze that learning, or make judgments based on that learning.
6. The problem contains clear statements as to what students are to do.
7. The problem indicates the credit students will receive for the solution.

TEST ITEM CONSTRUCTION GUIDELINES

A. GENERAL

1. Be sure each item deals with an important aspect of the content area, and not with trivia.

2. Be sure that the problem is clear, concise and unambiguous.

3. Be sure that each item is independent of all other items. The answer to one item should not be a condition for answering the next item, nor should a hint to one answer be unintentionally embedded in another item.

4. Avoid stereotyped phraseology.

5. Include all qualifications needed to provide a reasonable basis for response selection.

6. Be sure that the item is at the appropriate level for the competency.

7. Be sure that the item measures the intended competency.

8. Keep the reading difficulty and vocabulary level as simple as possible.

9. Avoid replication of a textbook in writing test items; don't quote directly from textual materials. Taken out of context, direct quotes from a text are often ambiguous.

10. Avoid trick or catch questions.

11. Item content should be accurate and up-to-date.

B. MULTIPLE-CHOICE ITEMS

1. The stem of the item should clearly formulate a problem. Include as much of the item as possible in the stem keeping the response options as short as possible. Include only the material needed to make the problem clear and specific. Don't add extraneous information.

2. Use negative questions or statements only if the knowledge being tested requires it. In most cases, it is more important for the examinee to know what a specific item of information is rather that what it is not.

3. If an item must be stated negatively, underline or capitalize the negative word.

4. Include four options, arranged in logical order, if one exists (e.g., numerical, alphabetical).

5. Be sure that there is one and only one correct or clearly best answer on which experts would agree.

6. Be sure wrong answer choices (distractors) are plausible. Eliminate unintentional grammatical clues and keep the length and form of all the answer choices similar. Grammatical inconsistencies, such as "a" or "an," give clues to the correct answer.

7. Use the option "none of the above" sparingly and only when the keyed answer can be classified unequivocally as right or wrong.

8. Avoid using "all of the above." It is usually the correct answer and makes the item too easy for examinees with partial information.

9. Avoid using words such as "always," "only," and "never" that may give away a wrong answer.

10. Avoid consistent preference for any particular response position for the correct answer.

C. MATCHING ITEMS

1. Keep both the list of descriptions and the list of options fairly short and homogeneous--they should both fit on the same page. Title the lists to ensure homogeneity and arrange the descriptions and options in some logical order.

2. Make sure that all the options are plausible distractors for each description to ensure homogeneity of lists.

3. The list of descriptions should contain the long phrases or statements, while the options should consist of short phrases, words, or symbols.

4. Each description in the list should be numbered (each is an item) and the list of options should be identified by letter.

5. Include more options than descriptions. If the option list is longer than the description list, it is harder for examinees to eliminate options. If the options list is shorter, some options must be used more than once. Always include some options that do not match any of the descriptions, or some that match more than one, or both.

6. In the directions, specify the basis for matching and whether options can be used more than once.

MATCHING

DIRECTIONS: Match tool name with tool function.

Tool Name	Tool Function
1. Drill	a. Removes a small amount of material from a previously produced hole.
2. Tap	b. Produce threads in previously produced holes.
3. Reamer	c. Produce a head hole flush with the material surface
4. Boring Bar	d. Remove metal from face or contouring workpiece edge
5. End Mill	e. Produce a smooth circular hole in material
	f. Produce extremely accurate finishes positioning within tenths and holding roundness within millionths

MULTIPLE CHOICE

When using CNC terminology, a "T" word usually refers to a:

a. tool function.

b. tab format.

c. tract location.

d. temporary storage.

PSYCHOMOTOR EVALUATION

PERFORMANCE EVALUATION

THROUGH THE PSYCHOMOTOR DOMAIN

Evaluation in the psychomotor domain looks at the physical skills the student is required to perform. Since tasks are most frequently "do" skills, a performance evaluation is the choice for those skills.

The instructor may also choose to evaluate the performance components of the task which are represented in the psychomotor objectives. This is especially useful for complex tasks.

Performance evaluations may test the process of task performance, the product of the performance, or both.

Process Evaluation

Conduct a process evaluation when:

* The process is critical and there is one correct way
* Safety hazards occur during the process
* When valuable equipment or materials can be damaged or wasted
* When the product cannot be evaluated

Product Evaluation

Conduct a product evaluation when:

* There is more than one correct way to achieve the product
* The product (what) is a more important than the process (how)
* When the product speaks for the process
* When the process cannot be evaluated

Process and Product Evaluation

Evaluate both process and product when:

* Both are critical
* When "best practices" want to be promoted

TOOLS OF TRADE-PERFORMANCE EVALUATION TOOLS

CHECKLIST

* For process evaluation

List all steps necessary in the process

Note absolutely critical steps

Note any steps where safety hazards may occur

EXAMPLE:

The student:	YES	NO	COMMENTS
1. Checked out proper tools and materials	____	____	_____
2. Put on proper protective attire	____	____	_____
3. Checked worked area for hazards	____	____	_____
4. Marked four parallel lines 2" apart on plate to be cut	____	____	_____
5. Checked eye protection has required lens for cutting	____	____	_____
6. Checked position of catch box	____	____	_____
7. Positioned/secured workpiece	____	____	_____

* For product evaluation
List how the product should look, operate.
Parts of the product are briefly described clearly.

EXAMPLE:

	Yes	No
a. Is neat	( )	( )
b. Includes the same information as contained in the rough draft	( )	( )
c. Reflects all corrections indicated	( )	( )
d. Is free of spelling, punctuation, and grammatical errors	( )	( )

NOTE: The above items are taken from the standard of performance objective.

RATING SCALE

The rating scale is most often used for product evaluation.

* Elements of the product are isolated representing appearance, function, precision, etc.
* A rating scale is developed -

  (0-4 or 1-5 is recommended)
* For each element of the product, points on the scale are defined (see example below)
* A performance evaluation key is developed (see example below)
* A competency level is determined e.g., a minimum of 4 on a 5 point scale for each element.

EXAMPLE:

Criteria:	4	3	2	1
Cutting Line	Vertical, Not pronounced	Uneven, Wavy	Course	Deep gouges
	4	3	2	1
Top Edge	Square, no melting	Irregular	Top edge melted	Top edge badly melted
	4	3	2	1
Bottom Slag	No slag evident	Little slag evident	Some slag evident	Much slag evident

PROCEDURE FOR WRITING PERFORMANCE TEST ITEMS

* You may follow these procedures when writing performance test items.

1. Write a description of the skill that is to be performed.
2. Write directions to students in language that will be understood by them.
3. If a case situation is needed, write it.
4. List the tools, materials, and equipment that will be needed to perform the test.
5. Include all safety procedures and note special precautions.
6. Write directions for the examiner. Include safety precautions.
7. If time is a critical standard include the estimated time that should be allowed for performing the test item.
8. Construct a performance checklist that can be used for evaluating the students' performance.

   An example of a performance checklist follows.

PERFORMANCE/PROCESS TEST ITEM

The following is a performance test item: Instructions to the student and the examiner are included. This page precedes the actual checklist.

* Task: Replace a Defective Switch.

Instruction to Examiner:

Indicate on the accompanying checklist whether or not each step was performed by the student.

Instructions to Student:

You will be given a circuit that has a defective switch and a new switch to install. Check the circuit and replace the defective switch.

Tools and Equipment:

Ohmmeter, flat head screw driver, open end wrench, new switch.

Estimated Time: Not applicable

* If student does not disconnect the power source this test should be stopped immediately.

TEST ITEM CHECKLIST FOR PERFORMANCE EVALUATION

When replacing the defective switch, the student:

		Yes	No
a.	Disconnected the power source. (This step must first be performed by the student. If it is <u>not</u> performed, the student <u>must</u> be told immediately to stop the test	( )	( )
b.	Selected the correct Ohmmeter scale . . .	( )	( )
c.	Calibrated the Ohmmeter	( )	( )
d.	Took a reading across the switch terminals with the Ohmmeter with switch in both the on and off position	( )	( )
e.	Removed the fasteners holding the switch.	( )	( )
f.	Disconnected the wires	( )	( )
g.	Fastened the wires to the new switch observing the color code	( )	( )
h.	Replaced the fasteners that hold the switch	( )	( )
i.	Reconnected the power to the circuit. . .	( )	( )
j.	Tested the switch by turning it on and off	( )	( )

PERFORMANCE EVALUATION SUMMARY

PERFORMANCE ITEMS

1. Provide directions for the teacher/evaluator.
2. List the equipment needed for the performance.
3. Provide directions to the student.
4. State the task or skill to be performed
5. State the criteria for evaluating the performance.

* Product Evaluation:
  a. Include all important parts of the product.
  b. Describe the parts of the product briefly and clearly.
  c. Organize the parts of the checklist in a way that facilitates their assessment.
  d. Make sure the rating scale is appropriate for each part of the product.
  e. Base the checklist on the way the product is supposed to look , work, be repaired, etc., on the job.
  f. Determine if two qualified evaluators using the checklist would score the same product in the same way or in nearly the same way.

* Process Evaluation:
  a. Include all important steps of the process.
  b. Stat the steps briefly and clearly.
  c. Sequence the steps in order of performance.
  d. Make sure the rating scale is appropriate for each step.
  e. Make sure that all statements are observable.
  f. Determine if two qualified evaluators using the checklist would score the same performance in the same way or in nearly the same way.

-SAMPLE-

PERFORMANCE CHECKLIST

TASK: Assist with unit admitting procedures.

PERFORMANCE OBJECTIVE: Given a patient to be admitted, assist with the admitting procedure. A check list will be used to rate performance. All items must receive an acceptable rating.

DIRECTIONS: Check appropriate column according to students' performance.

PERFORMANCE BEHAVIOR	YES	NO	COMMENTS
1. Prepared room for patient.			
2. Introduced patient to unit.			
3. Secured patient's valuables.			
4. Obtained urine specimen.			
5. Took patient's temperature, pulse, and blood pressure.			
6. Reported unusual observations.			
7. Acquainted patient with surroundings and schedule.			
8. Left patient in safe and comfortable position.			
9. Visited patient to aid in adjustment.			

Tips for Writing Performance Test Items

* Examine the task analysis "DO" skills to determine what tasks would best be tested with performance test items.

* Determine if tools, materials, space and time restraints permit the performance test to be conducted.

* Prepare specific student directions for taking the performance test.

* Prepare directions for the examiner.

* Prepare a checklist for evaluating the students' performance. The checklist should be:

  -- Free of subjective evaluation.

  -- Designed to measure: (1) the students' ability to perform a process, (2) the quality of a produced product, (3) both the process and product.

Additionally:

For tests designed to assess performance of a task that does not result in a tangible product (process), the following questions are relevant:

The checklist should include all safety procedures.

* The checklist standards should be based on the requirements of performing the task on the job.

* The checklist should include all important steps.

* The steps should be stated briefly and clearly.

* The steps should be sequenced in an acceptable order of performance.

* Any two qualified raters using the checklist should be able to evaluate the same performance in the same way or in nearly the same way.

Performance/Product Checklist. Some tasks require that both process and product be evaluated. This is particularly true when safety is involved. When both process and performance need to be measured, both a performance evaluation form and a product evaluation form should be completed.

Following is an example of performance and product test item.

EXAMPLES

Operating Gas Welding Equipment

Job 1: Oxyacetylene Welding, Butt Joint, Flat Position

Estimated Time: 15 minutes

Instructions to Student:

1. You will be given 2 pieces of 3" x 8" x 16-gauge mild steel. Make a butt joint with 1/6" root opening, flat position.

2. You will completely weld the joint on one side.

3. You will notify the examiner when you have finished so that your work may be inspected.

Tools and Equipment: Oxyacetylene welding torch, hoses, gauges, two practice plates, welding rod

Instructions to examiner:

1. The maximum time for this test is four hours. In addition, each task has a time limit, from 10 to 70 minutes, printed at the top of the task.

2. If the student has not completed the task in the allotted time, the students should be told to clean up the testing area and return to the staging area for assignment to another task. Steps the student did not complete should be marked "NO" and a comment to that effect written.

3. Students completing the task in the allotted time should return the testing area to its pre-test condition and then return to the staging area for assignment to another task.

4. The examiner should make all ratings on individual student "Performance Evaluation Checksheets" as work progresses. Rating information should not be shared with the student. Upon completion of the task, each student's Guidesheets should be returned to the student's folder.

5. The examiner should complete a Product Evaluation form when the task is finished.

TEST ITEM CHECKLIST FOR PERFORMANCE EVALUATION

When operating gas welding equipment, the student:

	Yes	No
a. Gas Welded Low and Medium Carbon Steels	( )	( )
b. Selected proper tools and equipment	( )	( )
c. Properly adjusted equipment	( )	( )
d. Properly set-up mental	( )	( )
e. Used proper techniques	( )	( )
f. Practices all safety requirements	( )	( )

TEST ITEM CHECKLIST FOR PRODUCT EVALUATION

The student's welded butt joint shows:

a. Butt Joint to Standards	( )	( )
b. Proper width of bead	( )	( )
c. No Undercut	( )	( )
d. Proper reinforcement	( )	( )
e. Proper penetration	( )	( )
f. Good ripple	( )	( )
g. Uniformity	( )	( )

OXYACETYLENE CUTTING

Unit II
PRACTICAL TEST

JOB SHEET #3 - MAKE 90 DEGREE CUTS ON MILD STEEL AND RESTART A CUT

STUDENT'S NAME _____ DATE _____

EVALUATOR'S NAME _____ ATTEMPT NO._____

Instructions: When you believe you are ready to perform this task, ask your instructor to observe the procedure and complete this form. All items listed under "Process Evaluation" must receive a "Yes" for you to receive an overall performance evaluation.

The student:	YES	NO
1. Checked out proper tools and materials.	_____	_____
2. Put on proper protective attire	_____	_____
3. Checked work area for hazards	_____	_____
4. Marked four parallel lines 2" apart on plate to be cut	_____	_____
5. Checked that eye protection has required lens for cutting	_____	_____
6. Check position of catch box	_____	_____
7. Positioned/secured workplace	_____	_____
8. Selected and installed cutting tip	_____	_____
9. Checked and cleaned tip as necessary	_____	_____
10. Adjusted oxygen pressure	_____	_____
11. Adjusted acetylene pressure	_____	_____
12. Ignited torch	_____	_____
13. Adjusted preheating flame	_____	_____
14. Depressed cutting oxygen valve & readjusted flame as needed	_____	_____
15. Closed cutting oxygen valve	_____	_____
16. Assumed a comfortable position	_____	_____
17. Placed hoses behind operator	_____	_____
18. Maneuvered torch with both hands	_____	_____
19. Positioned torch at edge or workpiece	_____	_____
20. Preheated metal to cutting temperature	_____	_____
21. Depressed butting oxygen valve	_____	_____
22. Cut the metal	_____	_____
23. Cooled the metal	_____	_____
24. Restarted a cut at an edge where a previous cutting ended	_____	_____
25. Finished the cut	_____	_____
26. Inspected the cut	_____	_____
27. Shut down the equipment	_____	_____
28. Checked in/put away tools and materials	_____	_____
29. Cleaned the work area	_____	_____
30. Used proper tools correctly	_____	_____
31. Performed steps in a timely manner (___hrs. ___ min.___sec.)	_____	_____
32. Practiced safety rules throughout procedure	_____	_____
33. Provided satisfactory responses to questions asked	_____	_____

EVALUATOR'S COMMENTS: _____

_____

_____

PRODUCT EVALUATION

(EVALUATOR NOTE: Rate the student on the following criteria by circling the appropriate numbers. Each item must be rated at least a "3" for mastery to be demonstrated. (See performance evaluation key below.) If the student is unable to demonstrate mastery, student materials should be reviewed and another product must be submitted for evaluation.)

Criteria:	4	3	2	1
Cutting Line	Vertical, Not pro-nounced	Uneven, Wavy	Course	Deep gouges
Top Edge	Square, no melting	Irregular	Top edge melted	Top edge badly melted
Bottom Slag	No slag evident	Little slag evident	Some slag evident	Much slag evident

EVALUATOR'S COMMENTS: _____

_____

_____

PERFORMANCE EVALUATION KEY

4 - Skilled - Can perform job with no additional training.
3 - Moderately Skilled - Has performed job during training program; limited additional training may be required.
2 - Limited Skilled - Has performed job during training program; additional training is required to develop skill.
3 - Unskilled - Is familiar with process, but is unable to perform job.

(EVALUATOR NOTE: If an average score is needed to coincide with a competency profile, total designated points in "Product Evaluation" and divide by the total number of criteria.)

AFFECTIVE EVALUATION

AFFECTIVE EVALUATION

Evaluation in the affective domain looks at the values, beliefs and attitudes which a student holds. For many years it was thought that this domain was out of the scope of the educational setting. Recently, however, the affective domain has gained greater significance, especially in vocational education, because attitude is a major variable in maintaining employment. We still must be cautious in approaching the affective domain of evaluation due to the personal nature of values, beliefs, and attitudes and their subjectivity.

Simply stated the affective domain should be evaluated on observable behaviors only. Going beyond observation of behavior would take the evaluator into the realm of interpreting motivation, judging meaning, or questioning reason. These cannot be a part of affective evaluation because they call for subjective translation.

In evaluating values, beliefs and attitudes a teacher must have those behavioral expectations stated very clearly in the performance objectives, which is the same for the cognitive or psychomotor domain. The teacher must be able to very clearly observe if the expected behavior occurs or not.

It also important to keep in mind that due to the short nature of many vocational programs that evaluation cannot usually occur beyond the valuing level of the affective taxonomy. (Reread pages 12 & 13 of yellow section of From Task List to Curriculum).

Affective domain objectives look a lot like cognitive or psychomotor objectives. The expectations may be knowledge based or performance or both e.g.:

- Explain why it is important to be ready to work when the shift starts. (cognitive)

- Be ready to start work when the shift starts. (psychomotor)

Most teachers would consider both of these objectives appropriate in evaluating on-time performance. The student can tell you why and can also do it.

In conducting an evaluation in the affective domain, many approaches may be useful. One relatively simple yet effective approach is to convert the psychomotor objectives to a checklist (yes _____ no _____ comments _____) and use it as a formative tool. Based on the checklists and improvement, a rating scale can then be used as a summative tool.

No matter what evaluation tool is used the teacher must remember to keep the evaluation as objective as possible. One way to maintain objectivity is to have very clear, measurable objectives which describe what desirable values, beliefs, and attitudes actually look like. Remember you can only objectively evaluate what you can see.

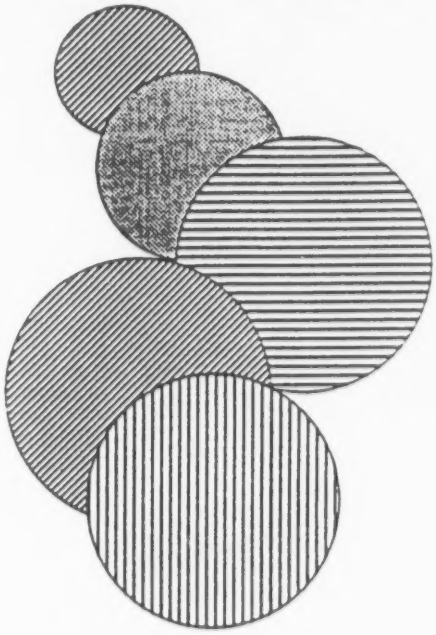
It is likely that affective evaluation will continue to be an important element in student assessment. Business and industry continues to tell us that they place a high value on certain behaviors which reflect values, beliefs, and attitudes:

Honesty
Timeliness
Adaptability to change
Team work
Willingness to learn
And others

If we expect individuals to demonstrate these behaviors in the workplace then we must expect these behaviors in the learning place.

ARTICULATION:

THE CRITICAL LINK TO EDUCATIONAL OPPORTUNITIES



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ARTICULATION: THE CRITICAL LINK TO EDUCATIONAL OPPORTUNITIES

INTRODUCTION

Articulation is a priority of the Colorado State Board for Community Colleges and Occupational Education. Articulation is the systematic coordination of course and/or program content within and between educational institutions to facilitate the continuous, efficient progress of students from grade to grade, school to school, and from school to work. Articulation reduces duplication of coursework or augments the curriculum by providing students with advanced technical skills. Articulation across secondary-postsecondary levels creates opportunities for schools to retain and improve programs that better serve students, employees, employers and the community as a whole.

Articulation aligns programs between secondary and postsecondary institutions, promotes smooth transition through various educational levels, reduces delay and duplication when moving from one educational level to another, and encourages cooperation and unity among educational institutions, and business and industry.

The purpose of this portfolio is to provide a guide for implementing articulation.

THE GOAL OF ARTICULATION

The goal of articulation is to provide the best-trained students possible with the most efficient use of resources.

PERCEPTIONS OF ARTICULATION

Positive perceptions of articulation promote effective articulation. Effective perceptions of articulation include:

1. Articulation provides for smoother student matriculation from level to level with fewer problems for students, counselors, faculty, and administrators.

2. Faculty members' awareness of other educational levels is increased.

3. Increased communications reduce misunderstandings.

4. Available resources between districts/institutions are shared.

5. Articulation reduces overlap of content, materials, and/or textbooks at different levels.

6. A system is provided for identifying student competencies.

7. Articulation encourages the development of a coordinated testing program.

8. Area-wide curriculum activities are provided.

9. Interdepartmental/interdivisional curriculum coordination is developed.

10. Articulation provides schedule flexibility for exchanging teaching experiences.

11. The community is involved in curriculum development.

12. Sequential progression programs are developed.

Perceptions of articulation may also present barriers to effective articulation. Ineffective perceptions of articulation include:

1. Community college officials got off on the wrong foot from the outset when they failed to determine what programs the local school systems were currently conducting.

2. There is a lack of direction in developing programs and in defining the acceptance of high school credit.

3. Each bureaucratic organization desires to protect its own interests and expand its own programs.

4. A clear understanding of the function of the secondary programs and the community college programs is lacking.

5. As long as programs are evaluated by the number of people enrolled and funded by enrollments, both institutions will be competing for the same people rather than articulating programs.

6. Competition for funds is a barrier.

7. There is a lack of determination of accountability between secondary and postsecondary occupational programs.

8. Role definitions for public school and community college programs do not exist.

9. Entry and exit skill levels of students have not been defined.

10. There is a lack of concern about articulation.

11. Empires, local pride, and jealousy are problems.

12. Secondary school personnel fear that community college programs will compete with existing programs rather than complement them.

GENERAL GUIDELINES FOR ARTICULATION

Recommended action steps:

For articulation to be successful, it is essential that as many people as possible be involved in the process. The key individuals are the classroom instructors and their technical committees. The following are general guidelines.

1. Chief administrators, or their designees, of each institution should meet to determine the needs of and benefits to the students and institutions involved. Goals should be identified and recommendations sought from advisory groups, consisting of representatives from business and industry, counselors, instructors, administrators, schools boards and councils, and state officials.

2. Designate one person from each institution to assume the leadership role for the institution. It is recommended that this person be given release time to coordinate articulation activities.

3. Establish an advisory committee, as described above, to assist in determining the specific needs and desires of the community and to develop a plan of action.

4. Identify goals, budgetary needs, implementation timelines, criteria, format, and procedures for institutional articulation agreements and other specific agreements.

5. Designate personnel to develop and implement individual program articulation agreements based on course outcomes and clearly defined tasks.

6. Provide opportunities for inservice to all concerned faculty and administrators in the complete articulation process.

7. Develop and implement a coordinated comprehensive marketing plan for the articulation process.

8. Develop a formal process to review and evaluate the articulate plan regularly.

REQUIREMENTS FOR STUDENTS, COUNSELORS, AND INSTRUCTORS

Students, counselors, and instructors must fulfill certain requirements in the articulation process, including:

Student Requirements

1. Giving notification of intent to articulate to another program to the instructor and counselor early in program/course.

2. Completing program/courses to satisfaction of instructor.

3. Making application through instructor/counselor at the end of program/course.

4. Forwarding application to receiving institution before enrollment deadlines.

Counselor Requirements

1. Informing students of availability of articulated programs.

2. Making articulation application forms available to students.

3. Maintaining copies of the application and competency profile chart in the students' files.

Instructor Requirements

1. Informing students of the articulation options.

2. Recommending or disapproving student's application.

3. Maintaining a competency profile chart on student.

SUGGESTIONS FOR ARTICULATION MEETINGS

First Meeting

The first meeting is the most crucial meeting.

1. The following activities should be completed prior to the first meeting:

   a. Appoint an articulation coordinator. Each institution desiring to engage in the development of articulation agreements should appoint an articulation coordinator who is given time to dedicate to articulation activities.

   b. Determine participating institutions. Identify the schools to be invited to participate in developing the articulation agreement(s).

   c. Enlist support from key administrative personnel. It is important to the success of the articulation program to involve key administration at each participating institution. The institution's key administrator (e.g., superintendent, director, dean of instruction, or president) should be contacted, their support enlisted, a meeting set up to discuss the institutions' participation in the development of the agreement.

      When you make your initial contact, you may discover that the institutions have some form of informal articulation agreements already in place with one or more institutions. It may be necessary again to give a brief overview of the articulation project. After some time has been spent with the traditional pleasantries and the brief overview, ask for a commitment to participate.

   d. Appoint an advisory council. In most cases, the key administrator will delegate project responsibility to an assistant. This assistant should possess two important characteristics: (1) the authority to make decisions regarding articulation which are binding on the part of the participating institution; and (2) willingness to attend the articulation meetings to represent the participating institution on the advisory council.

      At the first meeting, the institutions' advisory council members should be named and a date established for the first advisory council meeting.

      A letter should be sent to the advisory council members telling them the location, date, and time of the meeting. You may want to send a copy to the institutions' key administrators. A sample letter is included in the Appendix.

e. Arrange the meal and meeting site and time. This first meeting should last approximately one hour. Start at a time that allows advisory council members driving time. Therefore, as this is a relatively short meeting, it could begin at 10:30 a.m. followed by lunch at noon. Another option could be to begin with lunch at 11:30 a.m. and go immediately into the presentation about articulation. Include the following at the first meeting:

(1) A copy of an agenda for everyone. A sample agenda is included in the Appendix.
(2) Name tags.
(3) A list of advisory council members which includes name, position/title, address, and phone number. This will facilitate informal contacts that may be made between formal meetings.

2. The following activities are recommended for the first meeting.

a. The key administrator of the host school may want to welcome the group to the campus.

b. Introduce advisory council members, articulation coordinator, and special guests if applicable.

c. Present articulation overview. Transparency masters are included in the Appendix.

d. Provide question and answer period.

e. Select three areas to begin articulation planning. The articulation coordinator may have to guide the advisory council members in the selection process. Consider the following:

(1) Look for programs that are common to each institution. If there are no programs common to all institutions, then go with those that are offered at as many of the institutions as possible. You may need a copy of the institutions' catalogues and/or course listing to make the comparison.
(2) Find programs that have good curriculum design.

f. Appoint Task Force Members. There should be at least one task force member from each program at each institution. The advisory council members will be familiar with their instructors'/teachers' expertise and interests, and can identify the task force members for each program.

g. Set time and site for task force meeting. It is important that the task force members see the others' facilities and equip-

ment. You will find that they are proud of their facilities and equipment, and they like to show them off. Determine whether the meeting site arrangements will be made by you or the volunteer institution.

Second Meeting

1. The following activities should be completed prior to the first meeting with task force members:

   a. Send a letter to the task force members advising them of their assignment, congratulating them on their selection, and include the date and site of the meeting. Ask them to bring copies of course syllabi, competency profiles, course descriptions, etc., to the meeting: one for each participant, one for the articulation coordinator, and one for the file. (A sample letter is included in the Appendix.)

      Although meetings are generally attended only by task force members, advisory council members are always invited. Clearly state for whom attendance is optional.

   b. Arrange for hot coffee, donuts or cookies, and soft drinks to welcome the participants upon arrival.

   c. Prepare minutes of the previous meeting and copies for distribution.

   d. Prepare copies of the agenda for distribution. (A sample is included in the Appendix.)

   e. Prepare name tags.

   f. Provide paper and pens.

   g. The task force members will spend most of the day identifying common competencies and examining course content. The meeting could start at 9 a.m. and end at 2 p.m. The location of the meeting site relative to the participating schools is an important factor to consider when setting the time.

   h. Prepare a list of task force members which includes name, position/title, address, and phone number.

2. The following activities are recommended for the second meeting:

   a. Welcome to the school by the host school's key administrator.

   b. Introduce task force members, articulation coordinator, advisory council members, and special guests, if applicable.

c. Present Articulation overview. Transparency masters are included in the Appendix.

d. Provide question and answer period.

e. Divide task force members into program area groups for examination of course content. Select a room large enough for this purpose.

f. After examining the course content, ask each group to make a preliminary written report on the common competencies found between the courses. This is the goal of the meeting: to have all the task force group members sign off and agree on these common competencies. You might say something like: "Before you leave today, I want a list of the common competencies that you agree on." Although it may appear that the group is not working on their assignment, they may simply be getting to know one another before they proceed.

g. Upon completion of their examination and agreement on common competencies, set the next meeting date and site. As with the advisory council, the task force members are proud of their school facilities and equipment and would like to show them off. Therefore, use the same method you did with the advisory council in setting the next meeting date and site.

Third Meeting

1. The following activities should be completed prior to the third meeting:

   a. Arrange for work place and refreshments for the meeting.

   b. Prepare minutes of the previous meeting and copies for distribution.

   c. Prepare copies of the previously agreed upon competencies for distribution.

   d. Send a letter or memo to the task force members reminding them of the meeting date and site and include a copy of the common competencies for their review before the meeting.

   e. Send a letter or memo inviting advisory council members.

2. The following activities are recommended for the third meeting:

   a. Welcome to the school by the host school's key administrator.

   b. Distribute minutes of previous meeting.

   c. Distribute list of previously agreed upon competencies.

d. Match common competencies with courses/numbers by the task force members.

e. Ask program groups to review course matches.

f. Determine the method of articulation for each course. (The three ways in which a student can articulate are included in the Appendix.)

g. Pencil in variables, such as participating institution, course name/numbers, and credit hours on a work copy of the articulation documents. Since most articulation agreements are standardized and may be entered on a word processor, the variables are easily added thereby individualizing the agreements.

   To save time and work, be sure to have the signatures on the last page. Then if any revisions are made, the revisions can be made on the preceding pages and it will not be necessary to get the advisory council members' signatures again.

h. Set the next meeting site and time, using the previous same methods.

Fourth Meeting

1. The following activities should be completed prior to the fourth meeting:

   a. Prepare minutes of the previous meeting and copies made for distribution.

   b. This is the final meeting and the articulation agreements previously drawn up will be finalized and accepted. Therefore, invite advisory council members. Also, invite counselors as they will be instrumental in students' matriculating.

   c. Send a note to the task force members reminding them of the meeting date and location.

   d. Complete the articulation agreements with course numbers/names under the appropriate method of articulation and make copies for distribution at the meeting. (A sample articulation agreement is included in the Appendix.)

   e. Arrange for work place and refreshments for the meeting.

2. The following activities are recommended for the fourth meeting:

   a. Welcome to the school by the host school's key administrator.

b. Introduce members of the advisory council, task force, counselors, articulation coordinator and any special guest.

c. Review the articulation process for the counselors. It is not necessary that they know the details but rather discuss their requirements in the articulation process. Your goal is to gain their support.

d. Review the Application Form and procedures with the entire group. (An Application Form is included in the Appendix.)

e. Ask task force and advisory council members to make a final review of the articulation agreements. If the agreements are acceptable, the advisory council members may wish to sign them.

f. Arrange with advisory council members to obtain required signatures on final articulation agreement.

g. Set meeting date and site for next year's review.

COMPLETION OF ARTICULATION PROCESS

The following activities are recommended to complete the articulation process:

1. Send a letter to the task force members' chief administrator to go in their personnel file expressing appreciation for allowing the task force member to participate. A copy should be sent to the task force member. In the letter you may want to say something about the task force members' acceptance of a professional responsibility.

2. Prepare minutes of the fourth meeting and make copies for distribution at next year's review meeting.

3. Complete and individualize the articulation agreements for each institution.

4. Obtain signatures on the final articulation agreements. Make a copy for each signer. When you leave an unsigned copy with the administrator, tell them they have an <u>exact</u> copy of the agreement they signed and that you will send them an additional, final copy when all signatures are obtained.

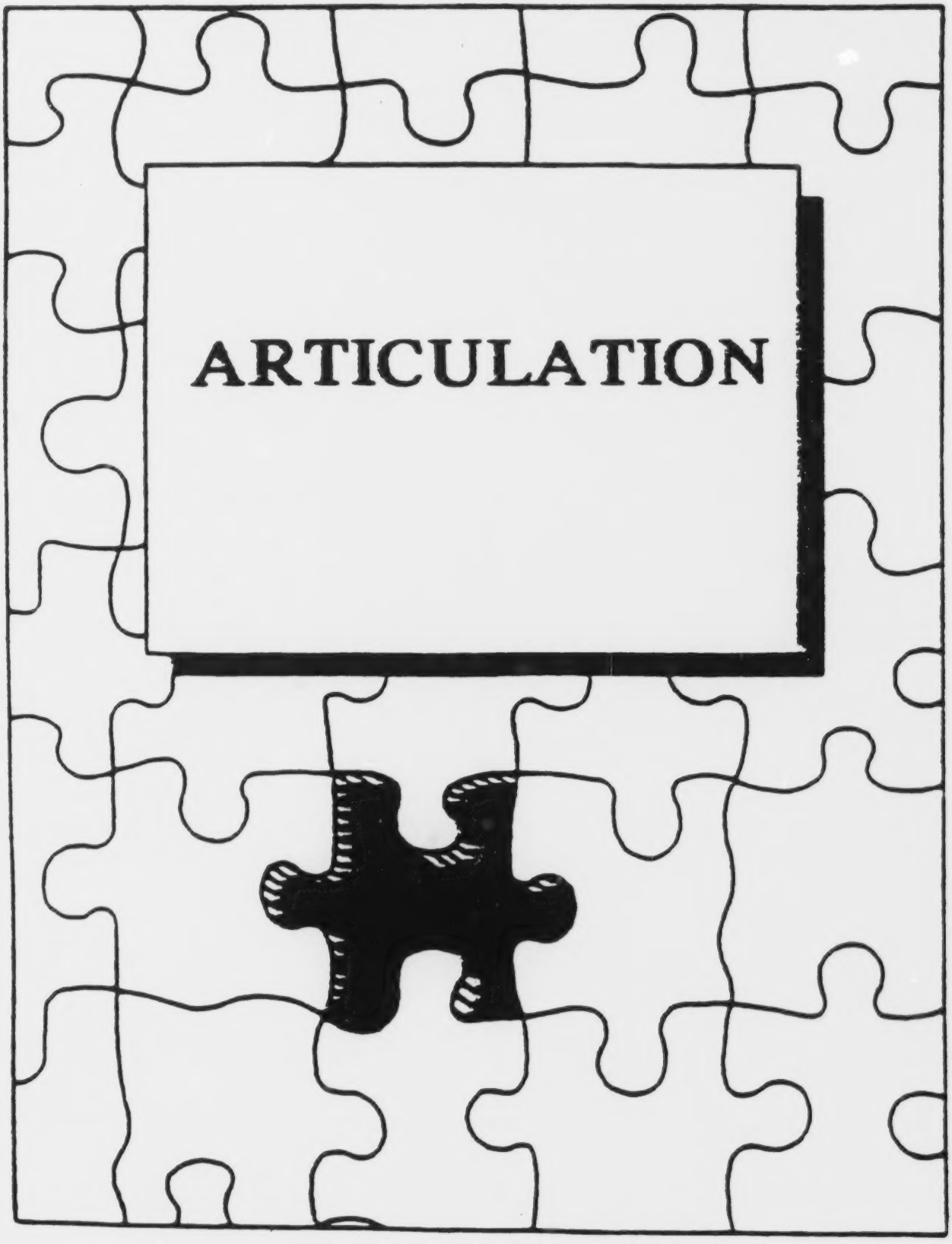
5. Place a date in the upper, right-hand corner to indicate each time a revision is made; e.g., "Revision 1," "Revision 2."

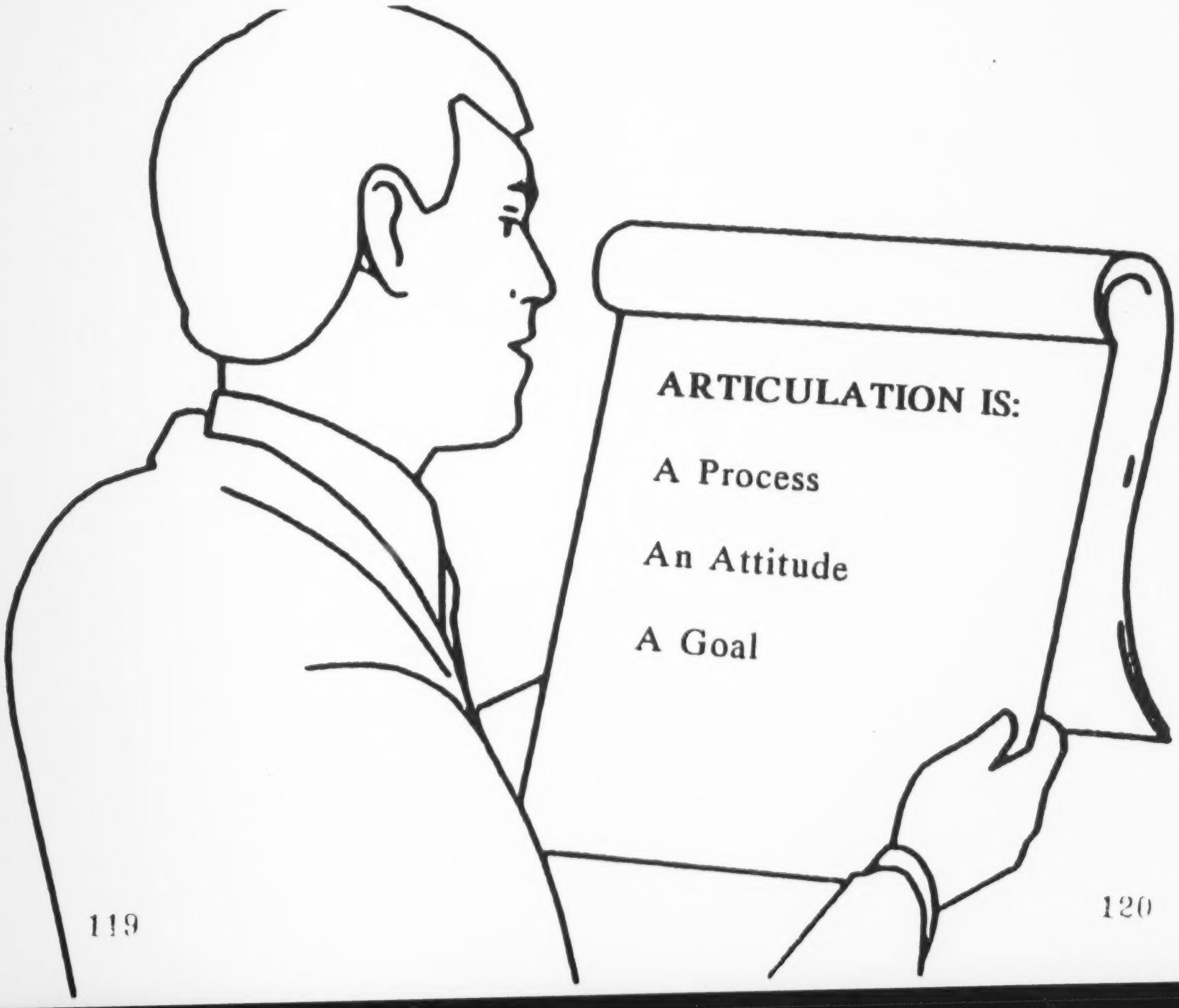
6. After all required signatures are obtained, mail copies of the agreements to the advisory council members and to the Colorado Community College and Occupational Education System, Manager of Professional Development and Curriculum Services.

PROCEDURES FOR UPDATING SIGNED ARTICULATION AGREEMENTS

It will be necessary for those schools in your area which have participated in the articulation project and have negotiated signed agreements to meet each year to update those agreements. As many of the same advisory council and task force members who were involved in previous years may be involved in the update, the meeting to update agreements could include the advisory council, task force members, and counselors.

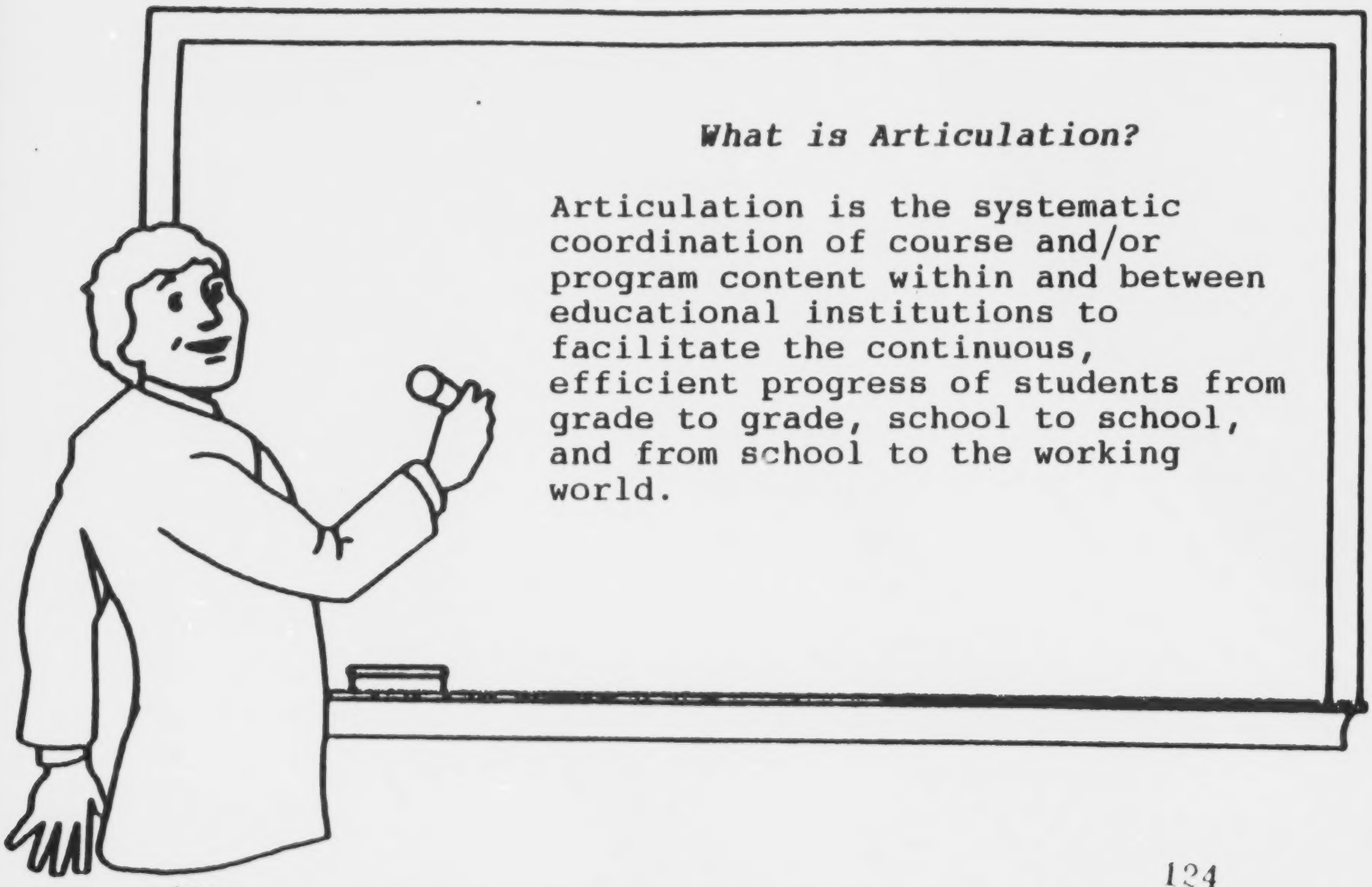
If any revisions are needed to update previously signed agreements, the extent of the revisions will determine the need for another meeting. If no teachers have been replaced, the revision may be simple; e.g., the date changed and administrators' signatures affixed. The task force (teachers/instructors) plays the most important role in the articulation process. Therefore, a new teacher/instructor may require renegotiation of that program's agreements. Ask the task force to bring all syllabi, curriculum guides, course content guides, etc., and to be prepared to work with the new teacher to negotiate the agreement.


ARTICULATION


ARTICULATION IS:
A Process
An Attitude
A Goal

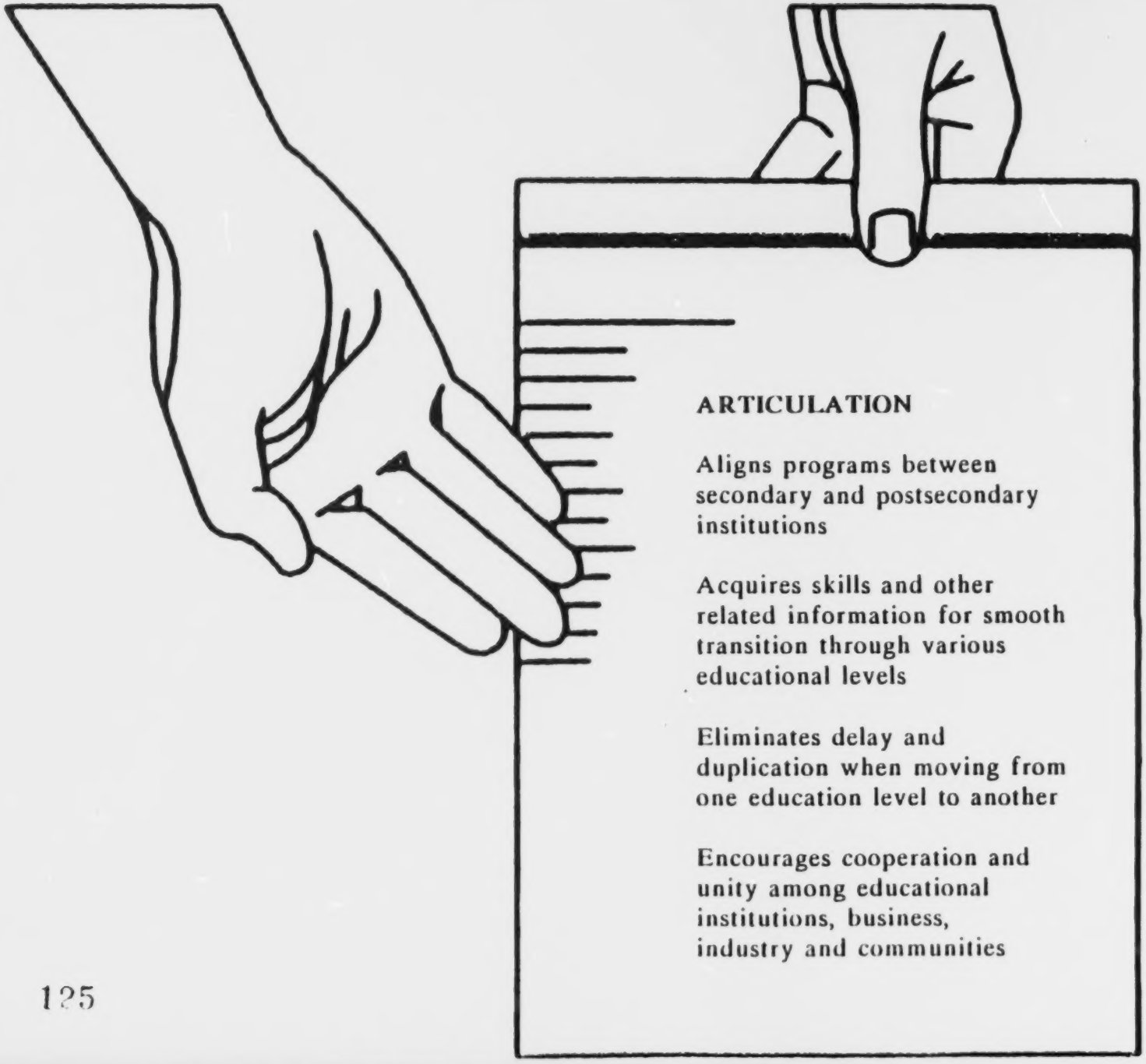
The Goal of Articulation

The goal of articulation is the best possible student trained with the least amount of resources.



What is Articulation?

Articulation is the systematic coordination of course and/or program content within and between educational institutions to facilitate the continuous, efficient progress of students from grade to grade, school to school, and from school to the working world.



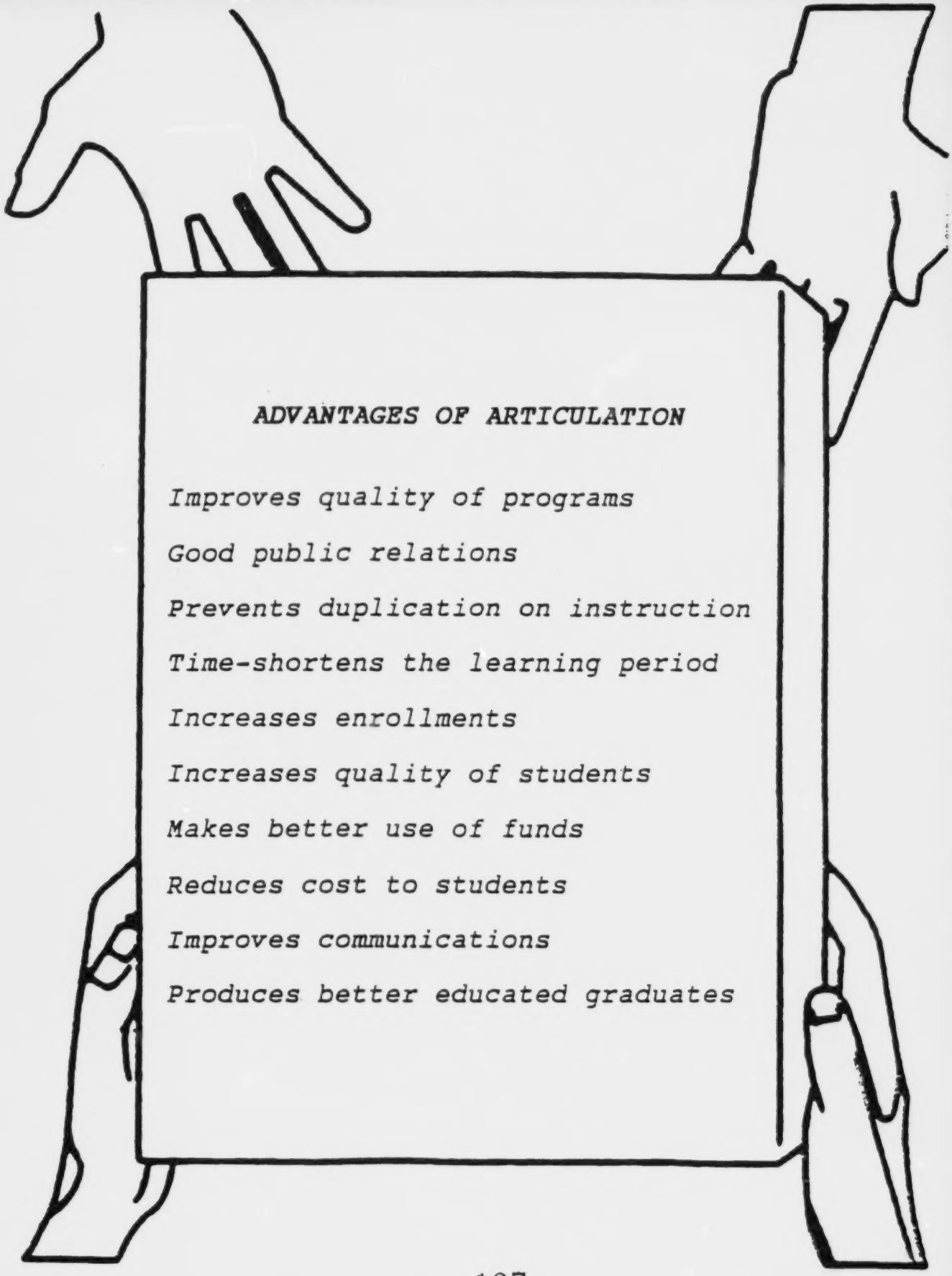
ARTICULATION

Aligns programs between secondary and postsecondary institutions

Acquires skills and other related information for smooth transition through various educational levels

Eliminates delay and duplication when moving from one education level to another

Encourages cooperation and unity among educational institutions, business, industry and communities



ADVANTAGES OF ARTICULATION

Improves quality of programs

Good public relations

Prevents duplication on instruction

Time-shortens the learning period

Increases enrollments

Increases quality of students

Makes better use of funds

Reduces cost to students

Improves communications

Produces better educated graduates

PRINCIPLES OF ARTICULATION

Provide leadership and commitment from the top

Involve faculty early

Build relationships based on respect and trust

All parties must benefit

Put agreements in writing

Communicate, communicate, communicate

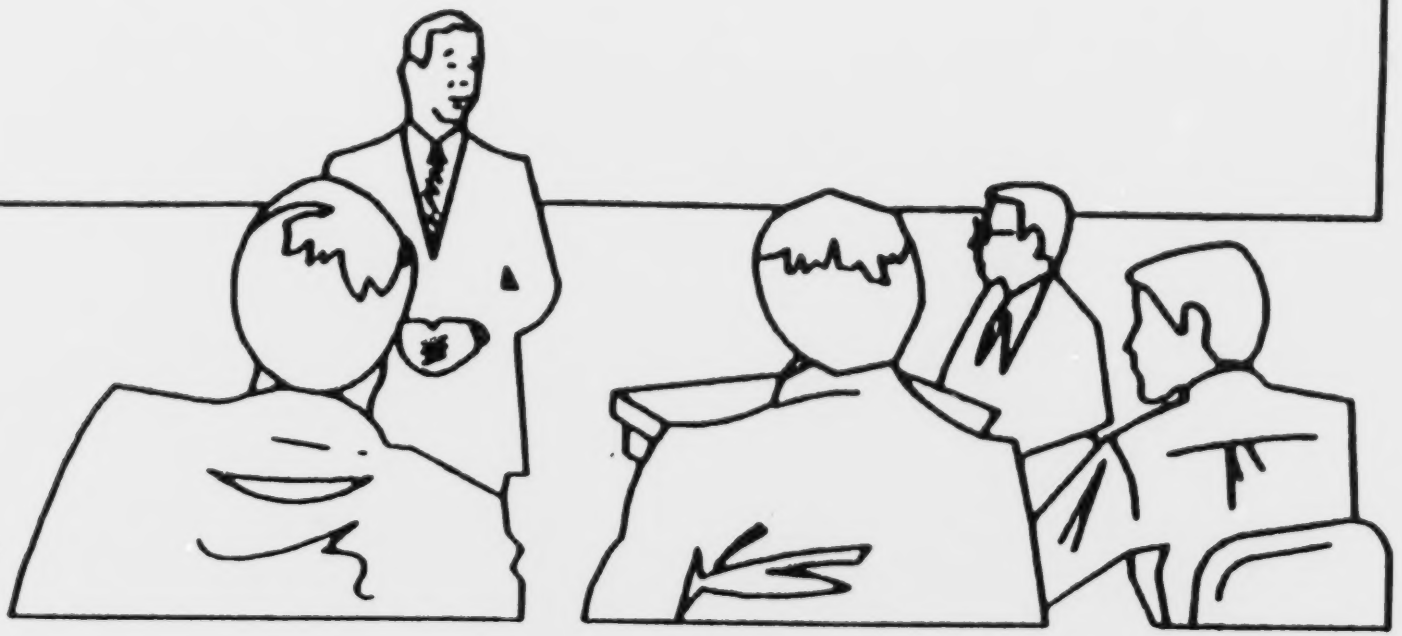
Start small and build

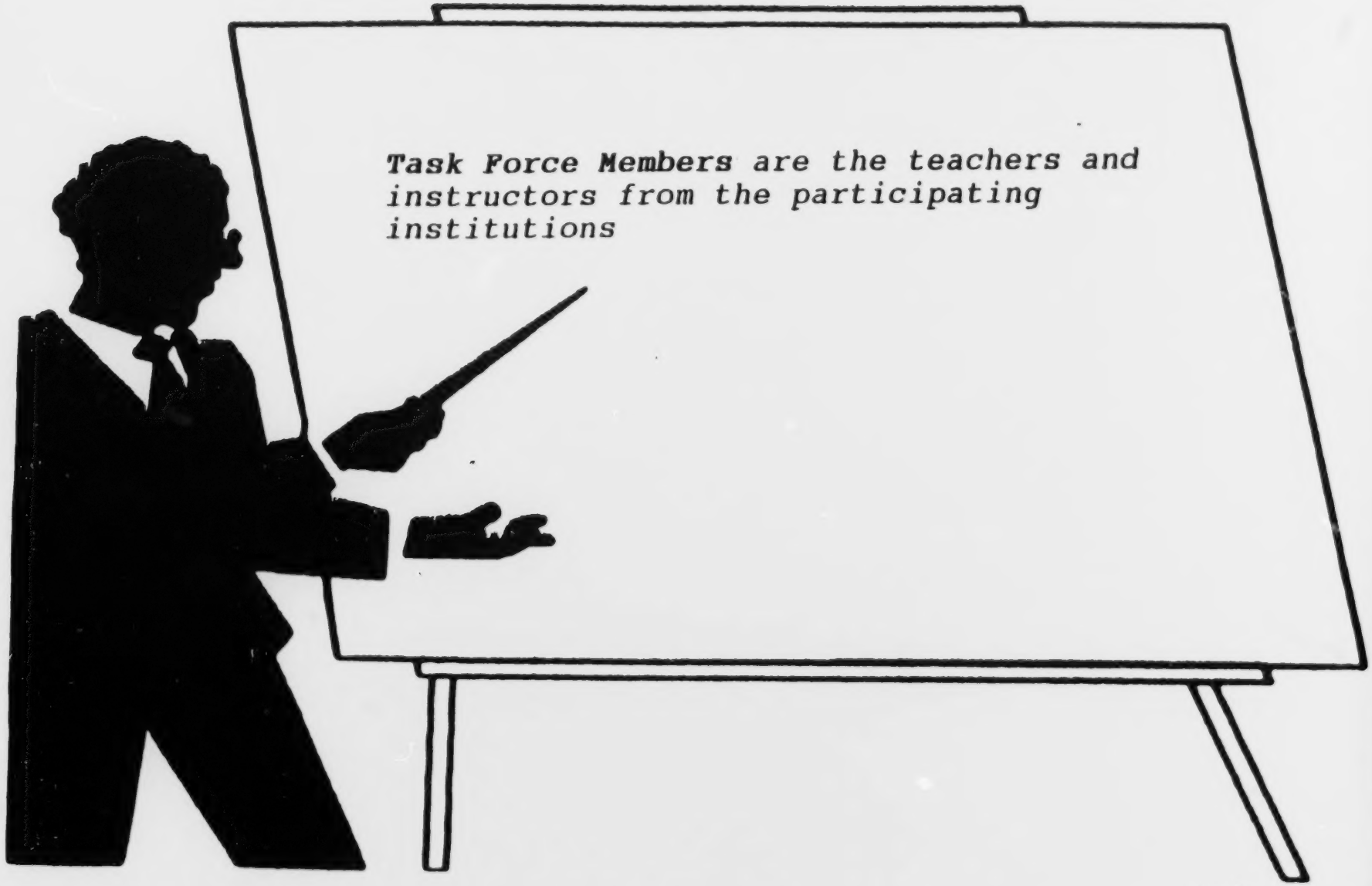
Make someone responsible

Build competency-based curricula

Focus on goals, not turf

Advisory Council Members *are the key administrative personnel from the participating institutions*



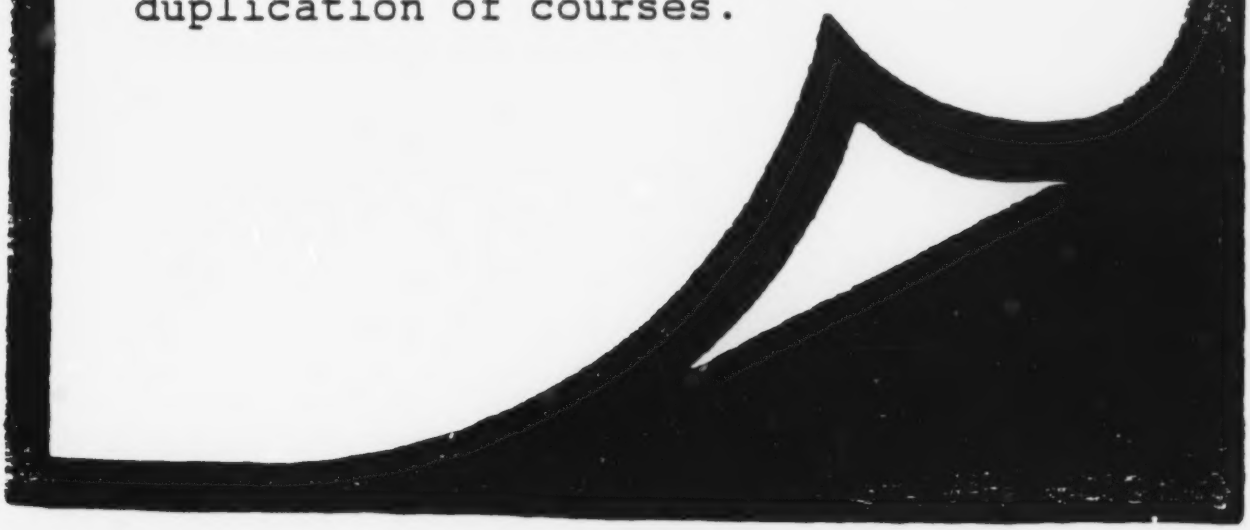

Task Force Members are the teachers and instructors from the participating institutions

HOW A STUDENT CAN ARTICULATE

Direct-Credit Transfer - Students merely transfer credit for a course or courses to another institution which accepts the credit

Advanced-Placement Standing - By the use of competency-based education, students are able to see what skills they have developed and where they should begin their post-secondary program. They do not have to repeat courses and can receive advanced placement.

Credit by Examination - Students take an examination to receive course credit and thus avoid duplication of courses.



PROCEDURES FOR ARTICULATION

STUDENT REQUIREMENTS

1. *Give notification of intent to the instructor and counselor early in the course.*

2. *Complete program/courses to satisfaction of the instructor.*

3. *Make application through instructor/ counselor at the end of the program/ course.*

PROCEDURES FOR ARTICULATION

COUNSELOR REQUIREMENTS

1. *Inform students of possibility of articulation.*

2. *Make articulation application forms available to students.*

3. *Maintain copies of the application and competency profile chart in the students' file.*

PROCEDURES FOR ARTICULATION

INSTRUCTOR REQUIREMENT

1. *Inform students of the possibility of articulation.*

2. *Recommend or disapprove student's application.*

3. *Maintain a Competency Profile Chart on applying student.*

SPECIAL NEEDS STUDENTS

Suggestions for special needs students

For learning problems or difficulties you have identified, you will need to either modify your materials and adapt them to your students' needs or change the teaching/learning situation.

When modifying competency-based materials for special needs student, one thing we do not do is lower the standards. If they must tune an engine in 2 hours, we expect them to do it in 2 hours. We allow them to take as much time as necessary to learn each task. Let's look at some things you can do besides modifying your materials.

1. Allow special needs students and others to work together.
2. Provide feedback on a daily basis.
3. Provide alternate learning experiences for the tasks:
    a. Extra demonstration by instructor
    b. Film or A/V demonstrations or explanations
    c. Reading (limited value for many)
    d. Extra practice
    e. Assistance by peers
    f. Assistance by instructor
    g. Work in small groups
4. Base learning on real world situations and equipment with a lot of hands on.

In a traditional classroom, the special needs student can be very disruptive. With competency-based education, there are very few disruptions; yet many will demand a lot of attention, much of which you can give them.

DO NOT treat these special needs students as "different," and DO NOT talk work with them in a condescending manner.

Most of the time, you would not modify the learning guide. You will

just provide more alternatives which will meet the needs of most of your students. With some students, a simple orientation each day, along with a list of what they should do, help to keep them on target.

The following is helpful:

1. On an individual basis, ascertain the student's capabilities, limitations, and handicaps. For reading, the San Diego Quick assessment could be used. If they miss 3 out of 10, consider them to need help. Use of the Fry method can also be helpful.
2. Try to communicate better with students.
3. Break the material down to its simplest form.
4. Sequence the materials.
5. Provide a lot of positive, success-oriented feedback to the student.
6. Compliment the student as much as possible, such as "good job," "you're doing great," etc.
7. Orally evaluate the students until they can complete written tests.
8. Keep written tests to a minimum.
9. Provide a lot of hearing experiences. Some schools have developed special audio tapes for some students.
10. Do not use one textbook. Use many references and select them on different reading levels. For nursing assistant and automotive some schools even use special comic-type books for some severely learning disabled students.
11. Establish time line and due dates for tasks to be completed. (For some students, use a contract signed by all appropriate parties.)
12. Send textbooks or references home with students and have parents, grandparents, friends, or spouse read to them.

14. For math deficiencies, especially for students in welding and machine trades, provide some remediation for the first quarter.
15. Read the materials to the student and give oral explanations.
16. If your school or college has a resource room, prepare a vocabulary list which your special needs people, and those in the resource room, can use with the student.
17. If you modify a guide, send it to the resource room.

    NOTE: It is important to remember that we are not trying to teach lower reading ability students how to read but, rather, how to compensate for their deficiencies.
18. The first thing you try may not work. Try the next item on your list.

When modifying student learning guides and materials, use the above information. In addition:

1. If a lot of reading is required, prepare audio tapes.
2. Assign task by task to make sure the students have learned it.
3. Monitor and evaluate completion times and then recontract to estimate the individual time. Speed of completion should be monitored carefully.
4. Prepare student learning guides which are very simple and refer students to the teacher constantly.
5. Eliminate written tests, use oral tests.

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